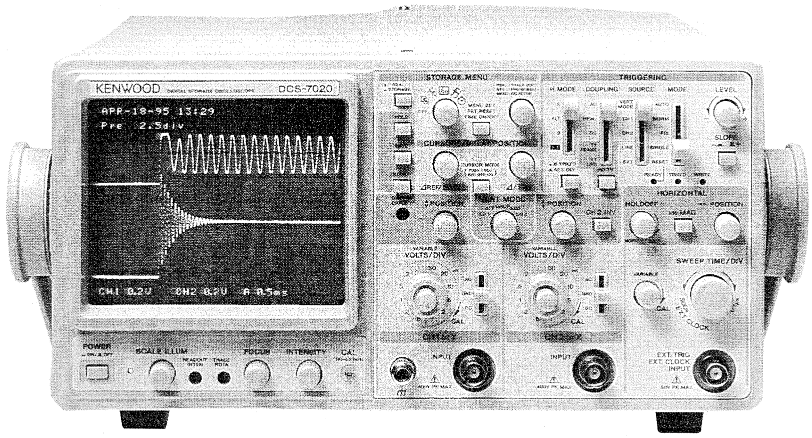
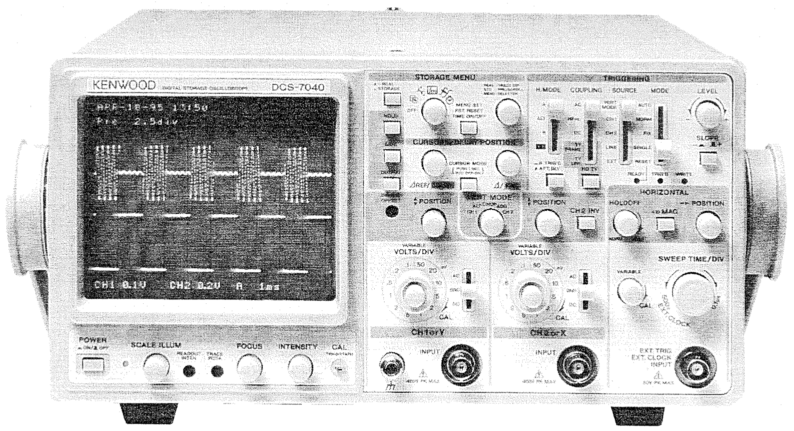
DIGITAL STORAGE OSCILLOSCOPE

# DCS-7020
# DCS-7040

## SERVICE MANUAL

KENWOOD CORPORATION


KENWOOD
DIGITAL STORAGE OSCILLOSCOPE
DCS-7020
APR-18-95 13:29
Pre 2.5div
CH1 0.2V CH2 0.2V A 0.5ms
STORAGE MENU
TRIGGERING
HORIZONTAL
VOLTS/DIV
SWEEP TIME/DIV
POWER
SCALE ILLUM
FOCUS
INTENSITY
CAL


KENWOOD
DIGITAL STORAGE OSCILLOSCOPE
DCS-7040
APR-18-95 13:50
Pre 2.5div
CH1 0.1V CH2 0.2V A 1ms
STORAGE MENU
TRIGGERING
HORIZONTAL
VOLTS/DIV
SWEEP TIME/DIV
POWER
SCALE ILLUM
FOCUS
INTENSITY
CAL

# WARNING

**The following instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.**

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# SPECIFICATIONS

【Real-Time Oscilloscope】

| Items | | |
|---|---|---|
| CRT | | |
| Type | | 150mm rectangular CRT with internal graticule |
| Acceleration voltage | | Approx. 12kV |
| Effective display area | | 8div×10div (1div=10mm) |
| Vertical axis (Common to CH1 & CH2) | | |
| Sensitivity (+10 to +35℃) | | 1 or 2mV/div: ±5%, 5mV/div to 5V/div: ±3% |
| Attenuator | | 12 ranges at 1-2-5 steps, ranges fine-adjustable |
| Input impedance | | 1MΩ±2%, approx. 25pF |
| Frequency response (+10 to +35℃) | 5mV/div to 5V/div | DC: DC to 50MHz (within −3dB)<br>AC: 5Hz to 50MHz (within −3dB) |
| | 1 or 2mV/div | DC: DC to 20MHz (within −3dB)<br>AC: 5Hz to 20MHz (within −3dB) |
| Rise time (+10 to +35℃) | 5mV/div to 5V/div | Approx. 7ns. |
| | 1 or 2mV/div | Approx. 17.5ns |
| Crosstalk | | −40dB or less (at 1kHz) |
| Operation modes | CH1 | CH1 single trace |
| | ALT | Alternated CH1 and CH2 signal display |
| | CHOP | Chopped CH1 and CH2 signal display |
| | ADD | Added CH1 and CH2 signal display |
| | CH2 | CH2 single trace |
| Chop frequency | | Approx. 250kHz |
| Polarity reversal | | CH2 only |
| ⚠ Max. input voltage | | 800Vp-p or 400V (DC+ACpeak at 1kHz or less) |
| Horizontal axis (CH2) | | |
| Sensitivity (+10 to +35℃) | | Same as vertical axis (CH2). |
| Input impedance | | Same as vertical axis (CH2). |

# SPECIFICATIONS

| Items | | |
|---|---|---|
| Frequency response<br>(+10 to +35℃) | | DC: DC to 1MHz (within −3dB)<br>AC: 5Hz to 1MHz (within −3dB) |
| X-Y phase difference | | 3° or less at 50kHz |
| Operation modes | | X-Y mode is selectable with H.MODE switch.<br>CH1: Y-axis, CH2: X-axis |
| ⚠ Max. input voltage | | Same as vertical axis (CH2). |
| Sweep | | |
| Sweep method | A | A sweep |
| | ALT | Alternated A sweep and B sweep |
| | B | B sweep |
| | X-Y | X-Y oscilloscope operation |
| Sweep time | A sweep | 0.5s/div to 0.1 μs/div ±3%, 1-2-5 steps, 21 fine-adjustable ranges |
| | B sweep | 50ms/div to 0.1 μs/div ±3%, 1-2-5 steps, 18 fine-adjustable ranges |
| Sweep magnification<br>(+10 to +35℃) | | ×10±5% (±8% at 0.5μs/div or more) |
| Linearity (+10 to +35℃) | | ±3% (×10: ±5%) |
| Holdoff | | A sweep is continuously variable from NORM position. |
| Trace separation | | B sweep is continuously variable by ±4 divisions or more with resp. to A sweep. |
| Delayed sweep | | Continuous delay (AFTER DELAY) and triggered delay (B TRIG'D) triggered by trigger signal |
| Delay time | | Continuously variable from 0.2 division to 10 divisions for 0.5s/div to 0.1 μs/div |
| Delay time error (+10 to +35℃) | | ±(3% of set value+1% of full scale)+(0 to 300ns) |
| Delay jitter | | 10000: 1 of 10 times as large as A sweep set value |
| Triggering | | |
| Trigger modes | AUTO | Automatic free running with no signals input |
| | NORM | Triggered sweep |
| | FIX | Sweep by setting trigger point at center of signal amplitude |
| | SINGLE | Single sweep mode |
| | RESET | Single sweep is restarted. |

# SPECIFICATIONS

| Items | | |
|---|---|---|
| Trigger signal sources | VERT | Input signal selected with VERT MODE switch. |
| | CH1 | CH1 input signal |
| | CH2 | CH2 input signal |
| | LINE | Commercial source frequency |
| | EXT | Signal input to EXT. TRIG connector |
| | The trigger source is fixed to CH1 if VERT MODE is set to ALT in the Chop and Storage mode. Or, it is fixed to CH2 if X-Y operation is selected in the Storage mode. | |
| Trigger coupling | AC | AC coupling from 10Hz |
| | HFrej | Low-pass filter coupling up to 10Hz |
| | DC | DC coupling |
| | TV FRAME | Composite video signal with vertical synchronizing signal separated |
| | TV LINE | Composite video signal with horizontal synchronizing signal separated |

Triggering sensitivity (+10 to 35℃)

| Mode coupling | | Signal freq. | Int.sensitivity(Amp.) | | Ext.sensitivity(Amp.) | |
|---|---|---|---|---|---|---|
| | | | NORM | FIX* | NORM | FIX* |
| Norm | AC | 10Hz to 20MHz | 1div | 1.5div | 100mV | 150mV |
| | | 20MHz to 50MHz | 1.5div | 2div | 150mV | 200mV |
| | HFrej | 10Hz to 10kHz | 1div | 1.5div | 100mV | 150mV |
| | | more than 10kHz | >min. | >min. | >min. | >min. |
| | DC | DC to 20MHz | 1div | 1.5div | 100mV | 150mV |
| | | 20MHz to 50MHz | 1.5div | 2div | 150mV | 200mV |
| | TV-F, TV-L | composite video signal | 1.5div | 1.5div | 150mV | 150mV |
| | HDTV | High Vision video signal | 1.5div | 1.5div | 150mV | 150mV |

- AUTO: The above-shown ratings are met at 40Hz or more.
- FIX*: The above-shown ratings are met at 50Hz or more.
- The internal sensitivity is expressed in terms of the amplitude on the CRT.
- HFrej sensitivity ">min." shows that the amplitude needed for triggering increases.

| External trigger terminal (Also used as external clock terminal.) | |
|---|---|
| Input impedance | 1MΩ±2%, approx. 25pF |
| ⚠ Max. input voltage | 100Vp-p or 50V (DC+ACpeak at 1kHz or less) |
| Calibration signal | Square wave, positive polarity,<br>1Vp-p ±3%, approx. 1kHz |

# SPECIFICATIONS

| Items | | |
|---|---|---|
| Intensity modulation | | |
| Input voltage | | Darkens at TTL level (+5V). |
| Input impedance | | Approx. 10kΩ |
| Frequency range (+10 to +35℃) | | DC to 3.5MHz |
| ⚠ Max. input voltage | | 100Vp-p or 50V (DC+ACpeak at 1kHz or less) |
| CH1 signal output (with 50Ω load) | | |
| Output voltage | | Approx. 50mVp-p/div |
| Output impedance | | Approx. 50Ω |
| Frequency response (+10 to +35℃) | 5mV/div to 5V/div | 100Hz to 50MHz (−3dB or less) |
| | 1 or 2mV/div | 100Hz to 20MHz (−3dB or less) |
| Trace rotation | | Trace line is adjustable with semi-fixed control on panel. |

**【Storage Oscilloscope】** (The values enclosed in [ ] are those of the DCS-7020.

| | | |
|---|---|---|
| Vertical axis (Common to CH1 & CH2) | | |
| Vertical resolution | | 8 bits (25 dots/div) |
| Dynamic range | | ±5div |
| Effective storage frequency | | DC: DC to 16MHz [8MHz] (Sine interpolation)<br>AC: 5Hz to 16MHz [8MHz] (Sine interpolation) |
| Effective rise time | | 40ns [80ns] or less (Linear interpolation) |
| Frequency response (+10 to +35℃) | 5mV/div to 5V/div | DC: DC to 16MHz (−3dB or less) |
| | | AC: 5Hz to 16MHz (−3dB or less) |
| | 1 or 2mV/div | DC: DC to 12MHz (−3dB or less) |
| | | AC: 5Hz to 12MHz (−3dB or less) |
| Memory capacity (Memory capacity used in each mode) | | |
| NORM sampling | | Display memory (for data): 2K words/channel (200 dots/div) |
| | | Display memory (for REF) : 2K words/channel |
| | | Acquisition memory : 4K words/channel |
| | | REF memory : 2K words/channel |

# SPECIFICATIONS

| Items | | |
|---|---|---|
| Roll mode | | Display memory (dor data): 2K words/channel<br>(200 dots/div) |
| | | Display memory (for REF) : 2K words/channel |
| | | Acquisition memory : 4K words/channel |
| | | REF memory : 2K words/channel |
| Memory backup | | Backed up by battery for approx. 30000 hours<br>(at room temperature).<br>Acquisition memory : 4K words/channel<br>REF memory : 2K words/channel |
| Sweep time & display mode | | |
| NORM sampling | | 0.1$\mu$s/div to 500s/div<br>(Magnification range: 0.1$\mu$s/div to 2$\mu$s/div [5$\mu$s])<br>(Max. sampling speed: 40MS/s [20MS/s]) |
| Peak detector | | 10$\mu$s [20$\mu$s]/div to 500$\mu$s/div (Sampling speed: 40MS/s) |
| Roll mode | | 0.2s/div to 500s/div |
| Storage method | | |
| AUTO | | Same as NORM when triggered. Data is updated by free running in other condition. |
| NORM | | Data is updated every time acceptable trigger signal is input. |
| SINGLE | | Storage operation is carried out when first acceptable trigger signal is input after resetting, then data is saved. |
| PEAK | MAX | Positive voltage glitches of up to 25ns [50ns] wide are detected. |
| | MIN | Negative voltage glitches of up to 25ns [50ns] wide are detected. |
| | MAX/MIN | Positive and negative voltage glitches of up to 50ns [100ns] wide are detected (and displayed alternately). |
| AVE (Averaging) | | Arithmetic average of 4, 16 and 64 times |
| SMT (Smoothing) | | Moving average of 32 words |
| PST (Persistence) | | Maximum and minimum values are displayed alternately in Storage mode. Reset by selecting PST. RESET. |
| ROLL | NORM | Data is displayed and updated continuously on CRT. |
| | SINGLE | Data is updated at pre-trigger set value after acceptable trigger signal is input. Then, data is saved. |

# SPECIFICATIONS

| Items | | |
|---|---|---|
| Magnification | | |
| Magnification | | Data is magnified up to ×10 from CRT center by linear interpolation when ×10MAG is pressed in Hold state. |
| Interpolation | | Previous value interpolation in magnification range (interpolation: OFF), linear interpolation and sine interpolation |
| Triggering | | |
| Pre-triggering | NORM | 0 to 20 divisions (in 2.5div steps) |
| | ROLL-SINGLE | 10 to 20 divisions (in 2.5 div steps) |
| B triggering | AFT. DLY | B starts after delay time. |
| | B TRIG'D | B TRIG'D after delay time. |
| X-Y | | DC to 16MHz [8MHz]<br>(−3dB or less, sampling speed is variable with SWEEP TIME/DIV.) |
| External clock(Also used as external trigger terminal.) | | |
| Operation | | Data is sampled at leading edge of signals input to external clock connector when SWEEP TIME/DIV is set to EXT. |
| Input impedance | | 1MΩ±2%, approx. 25pF |
| ⚠ Max. input voltage | | 100Vp-p or 50V (DC+ACpeak at 1kHz or less) |
| Input signal level | | TTL level<br>L level: +0.4V or less<br>H level: more than +3.2V |
| Input signal frequency range | | DC to 1MHz(1 kHz max. at roll mode) |
| Input signal duty ratio | | 20 to 80%<br>(L level: +0.4V, H level: +3.2V) |
| Output | | |
| | | Optional IF-10 or IF-20 may be connected.<br>(Both cannot be connected together.) |
| IF-10 | | GP-IB interface (Conforms to IEEE-488 1978.) |
| | Operation | Waveform displayed on CRT and CRT readout data are output to plotter through GP-IB interface (using TALK ONLY and HP-GL commands).<br>Numeric data of waveform displayed on CRT and CRT readout data are output to computer through GP-IB interface. |

# SPECIFICATIONS

| Items | | |
|---|---|---|
| IF-20 | | EIA RS-232C interface |
| | Operation | Waveform displayed on CRT and CRT readout data are output to plotter through RS-232C interface (using HP-GL commands).<br>Numeric data of waveform displayed on CRT and CRT readout data are output to computer through RS-232C interface.<br>Waveform displayed on CRT and CRT readout data are output to printer (DPU-412 made by SEIKO) through RS-232C interface. |
| | Baud rate | 9600/1200bps |
| | Data transmission | Data length: 8bits, stop bit: 1bit or more, parity bit : none, delimiter: CR+LF, handshake: CTS-RTS method |

### 【Readout Section】

| Items | |
|---|---|
| Display | Turned on and off by keeping CURSOR MODE switch depressed for 1 second or so. |
| Calendar | |
| Display | M/D/Y/H/M which is turned on and off by keeping TIME ON/OFF switch depressed for 1 second or so. |
| Clock accuracy | ±2 minutes/month |
| Battery life | Approx. 30000 hours (at room temp.) |
| Clock correction & setting | Set on Storage menu. |
| Set values | |
| Vertical axis | CH1 & CH2 scale factors (with probe detection), V-UNCAL, ADD & INV |
| Horizontal axis | A/B sweep scale factors (magnification conversion), ×10MAG, X-Y, external clock, & SWEEP VARIABLE UNCAL |
| Triggering | Delay time, B TRIG'D |
| Storage | X-Y sampling speed, display scroll & setting storage function (peak types, average and number of times, SMT, PST, ROLL & interpolation types), pre-triggering point, REF memory setting condition, menu, & output |

# SPECIFICATIONS

| Items | | |
|---|---|---|
| Cursor measurement | | |
| Cursor mode | | Measurement between ΔREF and Δcursors. Only ΔV1 may be set in X-Y mode. |
| | ΔV1 | Voltage converted using CH1 scale factor is displayed. |
| | ΔV2 | Voltage converted using CH2 scale factor is displayed. |
| | ΔT | Time converted using A sweep scale factor is displayed. |
| | 1/ΔT | Frequency converted using A sweep scale factor is displayed. |
| When V or H.VARI are UNCAL condition | RATIO | Voltage ratio and time ratio are displayed based on 5 divisions on CRT as 100%. |
| | PHASE | Phase difference is displayed based on 5 divisions as 360° . |
| Cursor measurement | Resolution | 10bits |
| | Measurement error | ±4% |
| | Measurement range | ±3.6 divisions or more from CRT center vertically<br>±4.6 divisions or more from CRT center horizontally |
| Display offset | | Vertical or horizontal shift between waveform displayed on CRT and waveform output from oscilloscope is corrected. |

【Power Supply】

| Items | |
|---|---|
| Power supply | |
| Supply voltage | 100/120/220/230VAC ±10% |
| Frequency | 50 or 60Hz |
| Power consumption (on 100VAC) | Approx. 57W, 69VA<br>(when optional IF-10 GP-IB interface is used) |
| Withstand voltage | 1.5kVAC, 1 minute or more |
| Insulation resistance | 100MΩ or more at 500VDC |

# SPECIFICATIONS

【Other Specifications】

| Items | | |
|---|---|---|
| Dimensions & weight (Values enclosed in parentheses include projections.) | | |
| Width | | 305mm (344mm) |
| Height | | 150mm (165mm) |
| Depth | | 400mm (459mm) |
| Weight | | Approx. 9.6kg |
| Operating temperature & humidity | | |
| Operating | | 0 to +40℃, 85% or less (No dew condensation) |
| Storage | | −20 to +70℃, 85% or less (No dew condensation) |
| Accessories | | |
| Probe | | PC-33, two |
| | Attenuation | 1/10 |
| | Input impedance | 10MΩ±1%, 22pF±10% |
| Instruction manual | | 1 copy |
| Adjusting screwdriver | | 1 |
| Power cord | | 1 |
| Replacement fuse | | 1 |

# SAFETY

## SAFETY

Before connecting the instrument to a power source, carefully read the following information, then verify that the proper power cord is used and the proper line fuse is installed for power source. The specified voltage is shown at the fuse holder of the AC inlet. If the power cord is not applied for specified voltage, there is always a certain amount of danger from electric shock.

### Line voltage

This instrument operates using ac-power input voltages that 100/120/220/230 V at frequencies from 50 Hz to 60 Hz.

### Power cord

The ground wire of the 3-wire ac power plug places the chassis and housing of the oscilloscope at earth ground. Do not attempt to defeat the ground wire connection or float the oscilloscope; to do so may pose a great safety hazard. The appropriate power cord is supplied by an option that is specified when the instrument is ordered.
The optional power cords are shown as follows in Fig. 1.

### Line fuse

The fuse holder is located on the rear panel and contains the line fuse. Verify that the proper fuse is installed by replacing the line fuse.

### Voltage conversion

This oscilloscope may be operated from either a 100 V to 230 V, 50/60 Hz power source. Use the following procedure to change from 100 to 230 volt operation or vice versa.

1. Remove the fuse holder.
2. Replace fuse F 1 with a fuse of appropriate value, 1 amp for 100 VAC to 120 VAC operation. 400 m amp for 220 VAC to 230 VAC operation.
3. Reinsert it for appropriate voltage range.
4. When performing the reinsertion of fuse holder for the voltage conversion, the appropriate power cord should be used. (See Fig.1.)

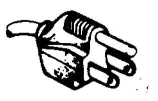
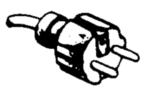
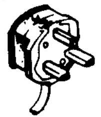
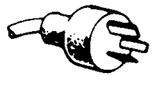
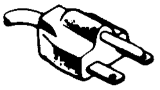
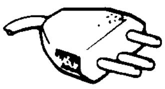
| Plug configuration | Power cord and plug type | Factory installed instrument fuse | Line cord plug fuse | Parts No. for power cord |
|---|---|---|---|---|
|  | North American<br>120 volt/60 Hz<br>Rated 15 amp<br>(12 amp max; NEC) | 1 A, 250 V<br>Slow blow<br>5 x 20 mm | None | E30-1951-05 |
|  | Universal Europe<br>220 volt/50 Hz<br>Rated 16 amp | North Europe<br>400 mA, 250 V<br>Slow blow<br>5 x 20 mm | None | E30-1952-05 |
|  | U.K.<br>240 volt/50 Hz<br>Rated 5 amp | 400 mA, 250 V<br>Slow blow<br>5 x 20 mm | 5 A | E30-1963-05 |
|  | Australian<br>240 volt/50 Hz<br>Rated 10 amp | 400 mA, 250 V<br>Slow blow<br>5 x 20 mm | None | E30-1953-05 |
|  | North American<br>240 volt/60 Hz<br>Rated 15 amp<br>(12 amp max; NEC) | 400 mA, 250 V<br>Slow blow<br>5 x 20 mm | None | – |
|  | Switzerland<br>240 volt/50 Hz<br>Rated 10 amp | 400 mA, 250 V<br>Slow blow<br>5 x 20 mm | None | – |

**Fig. 1 Power Input Voltage Configuration**

# CIRCUIT DESCRIPTION

## PREAMPLIFIER UNIT

### CH1, CH2

Each of the CH1 and CH2 inputs passes through an AC/DC/GND switch and enters the 1st attenuator (1/1, 1/10, 1/100).
The 1st attenuator is used in combination with the 2nd attenuator (1/1, 1/2, 1/4, 1/10) and the 5-fold function of the 2nd amplifier, to switch the 12 vertical ranges.
The head amp is composed of Q102 and IC101 (Q202 and IC201) and is a 1/1 buffer amp with an input impedance of 1 megohms and used for conversion of impedance. Q102 (Q202) is the source-follower. This head amp is installed between the 1st and 2nd attenuators.
Starting from the 2nd amp, this unit takes the differential amplifier configuration. The funcitions of IC102 (IC 202) include the variation and inversion functions. The variation function allows to vary the gain continuously according to the voltage applied to pin 5. The inversion function allows to invert the phase according to the voltages applied to pins 6 and 7. As this function is provided only for CH2, CH1 is fixed. At the CH2 side, switch is done by Q215, Q103 (Q203) is the regulated current supply for IC102 (IC202).
Q106 and Q107 (Q206 to Q207) form an emitter follower.
Q108 to Q111 (Q208 to Q211) form the cascode amp of the differential amp. The vertical position can be moved by regulating the current applied to the emitter of Q111 (Q211) based on the panel operation.
Q501 and Q502 (Q601 and Q602) form the amplifier which obtains the signals for the DSP unit and sends them to the DSP unit differentially.

### EXT. TRIG, EXT. CLOCK

A fixed attenuator is used for the EXT. TRIG signal. After the impedance has been converted by the source-follower of Q303 and the buffer amp of regulated current supply Q304, the signal is sent to the emitter-follower of Q314. Q315 is the feedback amp for the EXT. CLOCK signal, which is inverted by IC4a and sent to the DSP unit.

### Channel selector

The output from the position amp of each channel is transmitted to the channels elector composed of Q110 and Q111 (Q210 and Q211) and D103 to D106 (D203 to D206). The signal from the V-MODE logic turns the cathodes of D104 and D105 (CH1) or D204 and D205 (CH2) "H", and the signal of the channel turned "H" is transmitted to the feedback amp composed of Q2 and Q3.
Q1 lets the excessive bias current flow when CH1 or CH2 is in ADD mode.

### Trigger amp, trigger selecter

With CH1 (CH2), the differential outputs from IC102 (IC202) are input to the differential amp Q152 and Q153 (Q252 and Q253), where Q153 (Q253) forms a cascode amp with Q114 (Q214).
With EXT. TRIG the signal after the buffer amp is sent through the buffer of emitter-follower Q314, feedback amp Q312 an output as current from the collector of emitter ground amp Q313.
Only the single of the channel with which the cathode of CH1-D108, CH2-D208, EXT-D308 is turned "H" by the signal from the trigger controller is sent through CH1-D107, CH2-D207, EXT-D307 and output as current to the Horizontal unit.
Q31 the excessive bias current flow when CH1 or CH2 is in ADD mode.

### CH1 OUT

**The CH1 output is sent from the collector of Q152, through emitter-follower Q51 and output at CH1 OUT of the Final unit.**

### Trigger controller

The data on the trigger source set on the panel is input to pin 1 of IC1 and "H" or "L" is output at pins 4 to 8 according to the set state.
IC2 is used to switch between the data from IC1 and the CRT display data of each channel from V-MODE LOGIC. If the current mode is not V mode, the former data is selected. If the current mode is V mode, the latter data is selected for use in controlling the trigger selector.
Among CH1-IC2 pin 7, CH2-IC2 pin 9, CH3-IC2 pin 12, the terminal set with the panel is turned "H".

### V-MODE LOGIC

IC3 and IC4 generates a signal synchronized with the display channel select signal from the panel and the end of horizontal sweep, and a signal for controlling the channel selector based on the CHOP signal. (Figure 1)

### Vertical range converter

IC401, IC403, S102 and S202 output the vertical range, CAL and UNCAL data by turning them into analog values using an opamp for use as the R/O data. (Tables 1, 2)

### H/V control, level converter

The sweep code is sent in the form of serial data to IC408 and IC409, converted from serial to parallel, and converted into a signal between 0 and -12 V by IC404, IC405, IC406 and IC407.
IC410 outputs the CH1/CH2/ADD select signal and the Horizontal unit control signal. For the serial codes, refer to Tables 3 and 4.

## FINAL UNIT

### Final amplifier

The signal sent from the vertical preamp through the delay line is input to the feedback amp of Q1 and Q2. During A ALT B sweep, the variation of the vertical position of sweep B is controlled by the signal to the base of Q2 from the Sweep unit.
Q3, Q4, Q105, Q106 and IC1 are used to amplify the vertical signal and IC1, Q105 and Q106 are used to amplify the R/O

# CIRCUIT DESCRIPTION

characters. IC1 is used to switch between the vertical signal and R/O signal.
Q9-Q12, Q113 and Q114 are cascode-connected for use in driving the CRT.

### AC inlet, fuse

An external commercial supply voltage switch and fuse holder are provided.

### Line filter

A filter for elimination of common mode noise and normal mode noise is provided.

### CH1 OUT

The signal from the vertical preamp is output externally via Q201 and Q202 as a signal with 50-ohm impedance.

## SWEEP UNIT

### Trigger

The trigger signal supplied from the Preamp unit (X73-2120) is AC/DC coupled and the trigger level is added to it.
The obtained signal is input to the trigger shaping circuit to become a pulse signal.
If FIX is selected, the trigger level is fixed so that it is always around the center of the waveform.
With TV-FRAME the composite video signal is separated by the V sync separator and input to the trigger shaping circuit.
With TV-FRAME the composite video signal is separated by the H sync separator and input to the trigger shaping circuit.
HFrej is used to apply a 10 kHz LPF to the trigger signal.
The polarity of the trigger pulse signal can be changed with SLOPE +/-. The output signal is input to the sweep logic circuit.
There is an additional circuit which applies the trigger signal to the sweep logic in case the trigger pulse signal has not been input for a certain period and auto free-run mode has been selected.

### Sweep

When the trigger pulse is input to the sweep logic, the sweep gate is activated and the sweep wave is output.
When the sweep wave reaches a certain level, the sweep stop circuit is activated to close the sweep gate and end sweep.
When sweep gate is closed, the hold-off circuit is activated and, in a certain period after it, the sweep logic enters the trigger standby state.
The delayed sweep is performed either as the AFTER DELAY sweep or B TRIG'D sweep.
With the AFTER DELAY sweep, the voltage level of the main sweep wave and the voltage set with DTP are compared and delayed sweep is performed using the result signal as the trigger.
With the B TRIG'D sweep. sweep is triggered by the next trigger signal input after the voltage level of sweep wave have reached the voltage set with DTP.
In case ALT sweep is set, the main sweep and delayed sweep are sent alternately to the Horizontal amp.

### Horizontal amp

This circuitry switches between the sweep wave generated in the sweep block and the X signal and add H-POSITION.
After being magnified by 10 times if MAG has been selected, the signal is input to the R/O switch.
Here, the R/O signal is added to the vertical signal and the signal is amplified by the final amp to a high enough voltage level to drive the CRT.

### Intensity circuit

The intensity signal is generated with the sweep gate of the main sweep and that of the delayed sweep. During ALT sweep, a waveform for increasing the intensity of the delayed sweep section is generated with the main sweep. The voltage set with the INTEN potentiometer is added to the intensity signal and the voltage set with the R/O INTEN potentiometer is added to the R/O blanking signal and they are input to the high voltage circuit.
The high voltage circuits generates the CRT cathode voltage, G1 voltage and P1 voltage based on the intensity signal and the FOCUS potentiometer
The cathode voltage is controlled always constant by the opamp.
For use with the after-accelerating CRT, the anode voltage is also generated by the high voltage circuit.

### Power supply

AC voltages for astables DC voltage of 7. 7V, 15. 5V, 69V and 173V are input from the transformer, and they are turned into stable DC voltages of respectively +12, -12V, +5V, +55V and +140V, which are supplied to their respective units.

### CHOP

To observe signals of two each channels simultaneously, the vertical amp is switched with the CHOP signal.
The switching frequency rate is about 250 kHz.

## PANEL UNIT

This unit sends the potentiometer and switch data from the control panel to other units.
The circuitry has been designed so that, even when the V MODE is selected as the TRIG SOURCE during the ALT setting in the CHOP or STO mode, CH1 is selected as the TRIG SOURCE automatically.
The voltage setting of DTP is made by the opamp in the range from 0 to +4 V. The DISPLAY OFFSET control is a potentiometer for use in fine adjustment of the vertical position of the R/O characters and STO waveform displayed on the CRT. The CAL signal is a 1 kHz, 1 Vp-p square wave.
The intensity is controlled by the PWM based on the output from the original oscillator of CAL.

# CIRCUIT DESCRIPTION

## DSP UNIT

The DSP unit (X79-1300-0*) is used in the A/D conversion, control of the preamp and sweep units, output of characters to the CRT and output of stored waveforms to the CRT.

The waveform signals from the vertical unit are converted from analog to digital by IC100 (CH1) and IC200 (CH2). Each of the A/D converters (IC100, IC200) executes A/D conversion at the positive-going edge of the CLK signal input at pin 2. The output data is input to IC102 (CH1) or IC202 (CH2) and latched inside the IC for peak detection and write in the 2-phase memory, and the latched data is written in the memory of IC103 and IC104 (CH1) or IC203 and IC204 (CH2). Fig. 2 shows the interior of gate array IC102 or IC202 and its connection with the memory. Fig. 3 shows the timings of ILA1 and ILA4 of IC102 and IC202, and data is recorded in IC104 (IC204) then IC103 (IC203).

The memory devices used in the DSP unit are the serial access memory with separate input/output configuration and with built-in address generating counters. The built-in counter is reset when ADRW-goes "L" or when WRES is generated with the timing shown in Fig. 4. Data is written in memory when pin 12 (WE) of IC103, IC104, C203 or IC204 is "L", at the timing of the negative going of pin 15. The recorded data is output at the negative going of pin 2 (RCLK) of IC103, IC104, IC203 or IC204. The signals read out from the 2-phase memory are input to IC102 and IC202, and 2 words of signal is transferred simultaneously to the 16-bit data bus of ADD0 to ADD15.

The operation clock of these ICs is variable between 40 MHz nd 0. 4 Hz (20 MHz and 0. 4 Hz) according to the sweep time. The output from the 80 MHz oscillator composed of X1, Q301 and Q302 is divided by the counter of IC42 into 40 MHz, 20 MHz and 10 MHz, which are input to the multiplexer of IC38. The 40 MHz clock is input to pin 6 of IC41 and divided with the division ratio which is set with the serial data sent according to the sweep time. The signal output from pin 12 of IC41 is divided into two by IC37a and input to pin 1 of IC38 and pin 15 of IC41, and a signal between 0. 4 Hz and 4 kHz is output according to the sweep range. Among the 40 MHz, 20 MHz, 10 MHz, between 10 kHz and 4 MHz and between 0. 4 Hz and 4 kHz and EXTCLK signals input to IC38, one signal is selected according to the sweep code sent to IC38 and output from pin 5 of IC38. The output signal is input to the multiplexer of IC40 and the gate array of IC102 and IC202. The clock selected with IC40 is used as the operation clock for A/D converters IC100 and IC200 and the timebase PLD of IC45.

The main operations performed inside the timebase PLD of IC45 are the latch control, memory control and pretrigger control operations.

For the data write operation, LATCK is input to pin 61 and latch clocks CH1L1, CH1L4, CH2L1 and CH2L4 for the gate array and clocks WCLK, WRES and ADRW-for the memory are generated based on it. The number of write data which is determined by the set pretrigger value is counted using SGA (SGB) input to pin 58 (pin 57). The CPU is informed of the completion of data write with the interrupt applied when ADRW goes "L". The PLD includes a counter which is synchronized with the counters built in the memory and, when 4K words of data has been written, it outputs address data (YBUS0 to YBUS7) upon request from the CPU.

The data read operation is performed based on the timing shown in Fig. 5. The read data is sent through the line driver of C28 and IC30 and written in the memory of IC24 and IC25.

C13, IC14, IC16 and IC47 are decoders which output the serial data for use in the horizontal. timebase PLD, divider circuit and gate array control and the signal for use in the port control.

The position of the readout cursor and the DTP are converted into 12-bit serial data by A/D converter IC2 and the data is transmitted to the CPU.

IC10 and IC15 transfers data to the data bus when pin 9 of IC47 in the import section goes "L".

The transferred data includes the panel information (SINGLE, READY*, 10MAG, encoder), timebase PLD information and the battery detection result.

The rotary encoders used as the menu select knob and switch time switching knob have two outputs (phase A, phase B). The timings of phases A and B are as shown in Fig. 6. The outputs of phases A and B are input to the Schmitt circuit of IC11 and IC12 to eliminate chattering and shape the waveforms. When phase A varies, pin 8 of IC11 outputs a trigger pulse to inform the CPU of the change in the rotary encoder by turning pin 8 of IC9 "L". The CPU judges the rotation direction from the variations in phases A and B at the moment it is interrupted.

IC16 is a calendar clock which is battery-backed up by lithium battery BA1 even when the power is OFF. The 32. 768 reference clock generated by X'tal oscillator X3 is also running while the power is OFF. When power is ON, the CPU reads data at a constant interval and updates the calendar on the SRT whenever there is a change in the data.

The battery power is detected with IC36a. When the battery voltage drops below 2. 4 V, it sets pin 17 of IC15 "H" to inform the CPU of it and displays "BATT. DOWN" on the CRT.

IC32 is the D/A converter which converts the trace position data of B sweep into analog voltage.

The display clock has been designed to implement the readout display function. It is composed of VRAM IC19, the VRAM address buss switch for IC20, IC21, IC22 and IC23, R/D PLD IC17, D/A converters IC33 and IC34 and opamp IC 35.

For the vertical range input operation, the analog voltages (CH1ATT, CH2ATT) set according to the ranges are input directly to the CPU. As the CPU incorporates A/D converters, it judge the range settings by converting the input voltages from analog to digital.

The R/O PLD contains the latch for operation mode selection, display blanking generator, VRAM address counter, VRAM data bus switch, latch for X-Y data readout and latch for Y-axis

# CIRCUIT DESCRIPTION

D/A data expansion (for use with the cursor), and generates the signal for use in R/O display.

The X data output from the R/O PLD is sent to IC33 and the Y data is sent to IC34. The analog signals obtained by conversion in IC33 and IC34 are input in the horizontal and vertical final amps.

In the storage mode, every dot of waveform is output in 1 µs so the waveform display period is about 8 ms with 4 waveforms (CH1, CH2, REF1, FEF2) each of which uses 2K words of data. As every dot of character is displayed in 2 µs, the character display period is about 6 ms and the period required for updating the CRT display in the storage mode becomes about 20 ms which is equal to the total of the waveform display, character and data transfer periods.

In the realtime mode, every character dot is output in 5.3 µs so the character display period is about 16 ms while the data transfer period is about 5 ms. As a result, the period of display for a screen becomes about 21 ms.

Fig. 7 shows the timings of R/O UBL, $\overline{\text{R/O REQ}}$ and $\overline{\text{R/O BLK}}$ used for displaying characters. R/O UBL is output so that the dots light for 0.75 µs. $\overline{\text{R/O REQ}}$ in the realtime mode is output for 1.25 µs providing margins of 0.25 µs before and after R/O UBL. This signal is fixed at "L" in the storage mode. $\overline{\text{R/O BLK}}$ in the realtime mode is output for 2 µs to clear the waveforms, providing margins of 0.75 µs before and 0.5 µs after R/O UBL. In the storage mode, only the waveforms of the channel(s) which require(s) waveform display are lit.

## PREAMPLIFIER UNIT

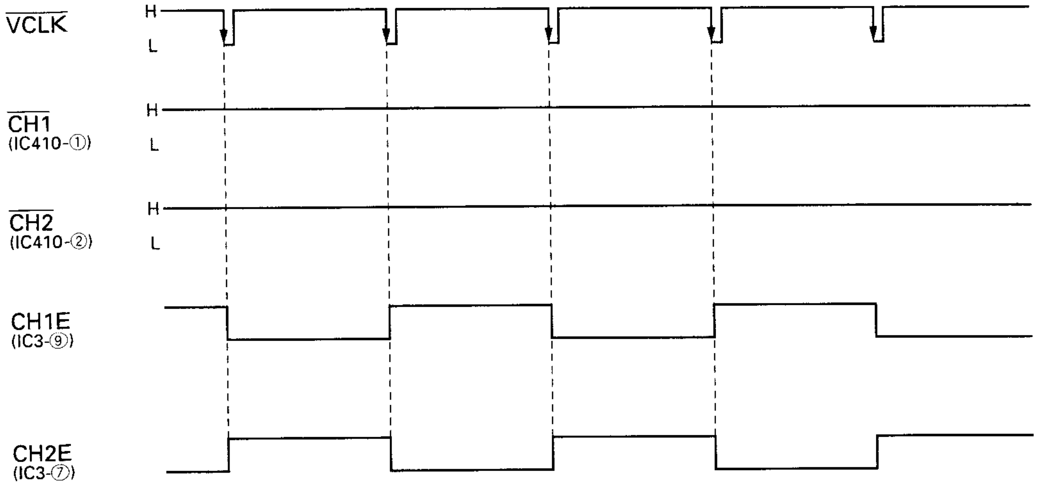


Fig. 1 V Mode Logic in ALT or CHOP Mode

**Table. 1 CHIATT. CH2**

| V-Range (/div) | Voltage Range (V) |
|---|---|
| 5 V | 4.124 ~ 5.000 |
| 2 V | 3.790 ~ 4.123 |
| 1 V | 3.456 ~ 3.789 |
| 0.5 V | 3.130 ~ 3.455 |
| 0.2 V | 2.804 ~ 3.129 |
| 0.1 V | 2.470 ~ 2.803 |
| 50 mV | 2.136 ~ 2.469 |
| 20 mV | 1.810 ~ 2.135 |
| 10 mV | 1.484 ~ 1.809 |
| 5 mV | 1.150 ~ 1.483 |
| 2 mV | 0.816 ~ 1.149 |
| 1 mV | 0.000 ~ 0.815 |

**Table. 2 UNCAL Voltage Check Table**

| CH1 CAL | CH2 CAL | SWP CAL | Voltage Range (V) |
|---|---|---|---|
| > | > | > | 4.406 ~ 5.000 |
| > | > | CAL | 3.777 ~ 4.405 |
| > | CAL | > | 3.147 ~ 3.776 |
| > | CAL | CAL | 2.518 ~ 3.146 |
| CAL | > | > | 1.888 ~ 2.517 |
| CAL | > | CAL | 1.257 ~ 1.887 |
| CAL | CAL | > | 0.626 ~ 1.256 |
| CAL | CAL | CAL | 0.000 ~ 0.625 |

# CIRCUIT DESCRIPTION

**Table. 3 Horizontal Serial Codes**

| Order of Transfer | Contents |
|---|---|
| Bit 00 | "H" in STO mode, "L" in REAL mode. |
| Bit 01 | "L" when B TRIG'D is ON, "H" when OFF. |
| Bit 02 | "L" with x10MAG display in REAL mode, "H" in other cases. |
| Bit 03 | "L" with X-Y display in REAL mode, "H" in other cases. |
| Bit 04 | "H" with ADD display, "L" in other cases. |
| Bit 05 | "H" with CH1 display and X-Y display, "L" in other cases. |
| Bit 06 | "H" with CH2 display, "L" in other cases. |
| Bit 07 | Not used: "L" |
| Bit 08 | B SWEEP 5 |
| Bit 09 | B SWEEP 4 |
| Bit 10 | A SWEEP 5 |
| Bit 11 | A SWEEP 4. |
| Bit 12 | "L" during adjustment, "H" in other cases. |
| Bit 13 | Not used: "L" |
| Bit 14 | Not used: "L" |
| Bit 15 | Not used: "L" |
| Bit 16 | B SWEEP 3 |
| Bit 17 | B SWEEP 2 |
| Bit 18 | B SWEEP 1 |
| Bit 19 | A SWEEP 3 |
| Bit 20 | A SWEEP 2 |
| Bit 21 | A SWEEP 1 |
| Bit 22 | Not used: "L" |
| Bit 23 | Not used: "L" |

**Table. 4 Sweep Codes**

| SWEEP TIME/DIV | SWEEP1 | SWEEP2 | SWEEP3 | SWEEP4 | SWEEP5 |
|---|---|---|---|---|---|
| 0.1 μs | 0 | 0 | 0 | 0 | 1 |
| 0.2 μs | 0 | 1 | 0 | 0 | 1 |
| 0.5 μs | 1 | 1 | 0 | 0 | 1 |
| 1 μs | 0 | 0 | 0 | 1 | 0 |
| 2 μs | 0 | 1 | 0 | 1 | 0 |
| 5 μs | 1 | 1 | 0 | 1 | 0 |
| 10 μs | 0 | 0 | 0 | 0 | 0 |
| 20 μs | 0 | 1 | 0 | 0 | 0 |
| 50 μs | 1 | 1 | 0 | 0 | 0 |
| 0.1 ms | 0 | 0 | 1 | 1 | 1 |
| 0.2 ms | 0 | 1 | 1 | 1 | 1 |
| 0.5 ms | 1 | 1 | 1 | 1 | 1 |
| 1 ms | 0 | 0 | 1 | 0 | 1 |
| 2 ms | 0 | 1 | 1 | 0 | 1 |
| 5 ms | 1 | 1 | 1 | 0 | 1 |
| 10 ms | 0 | 0 | 1 | 1 | 0 |
| 20 ms | 0 | 1 | 1 | 1 | 0 |
| 50 ms | 1 | 1 | 1 | 1 | 0 |
| 0.1 s | 0 | 0 | 1 | 0 | 0 |
| 0.2 s | 0 | 1 | 1 | 0 | 0 |
| 0.5 s or less | 1 | 1 | 1 | 0 | 0 |

## DSP UNIT

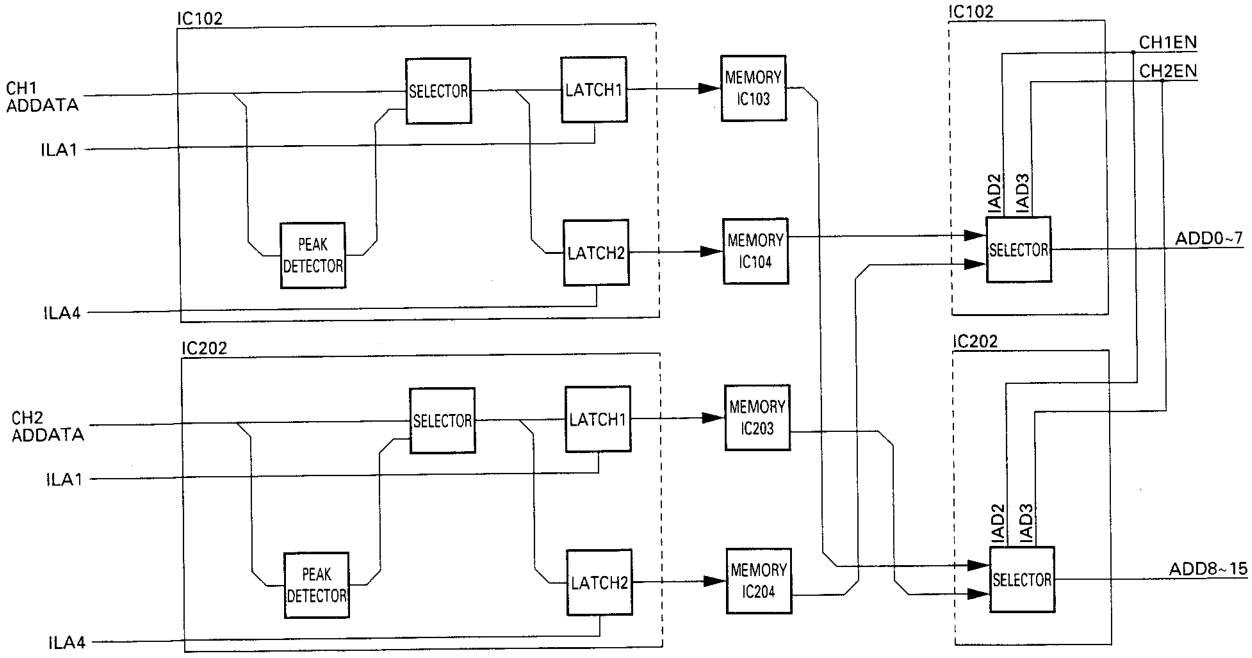

IC102
CH1 ADDATA
ILA1
ILA4
SELECTOR
LATCH1
LATCH2
PEAK DETECTOR
MEMORY IC103
MEMORY IC104
IC102
CH1EN
CH2EN
IAD2
IAD3
SELECTOR
ADD0~7
IC202
CH2 ADDATA
ILA1
ILA4
SELECTOR
LATCH1
LATCH2
PEAK DETECTOR
MEMORY IC203
MEMORY IC204
IC202
IAD2
IAD3
SELECTOR
ADD8~15

Fig. 2 Internal Block Diagram of Gate Array

# CIRCUIT DESCRIPTION

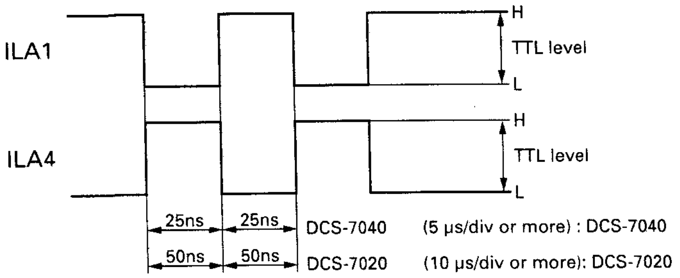

ILA1
ILA4
H
TTL level
L
H
TTL level
L
25ns
25ns
DCS-7040
50ns
50ns
DCS-7020
(5 µs/div or more) : DCS-7040
(10 µs/div or more): DCS-7020

Fig. 3 Clocks ILA1 and ILA4

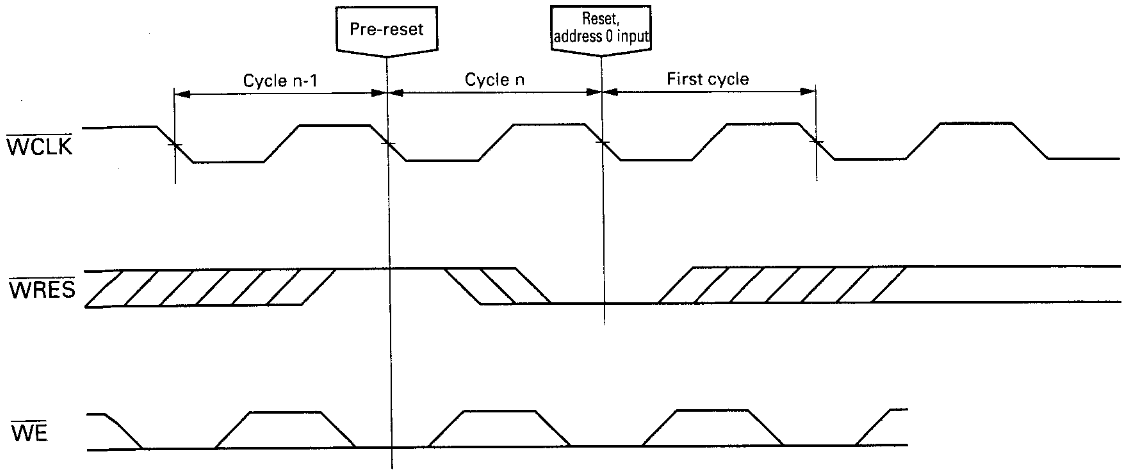

Pre-reset
Reset, address 0 input
Cycle n-1
Cycle n
First cycle
WCLK
WRES
WE

Fig. 4 Acquisition Memory Write Reset Cycle

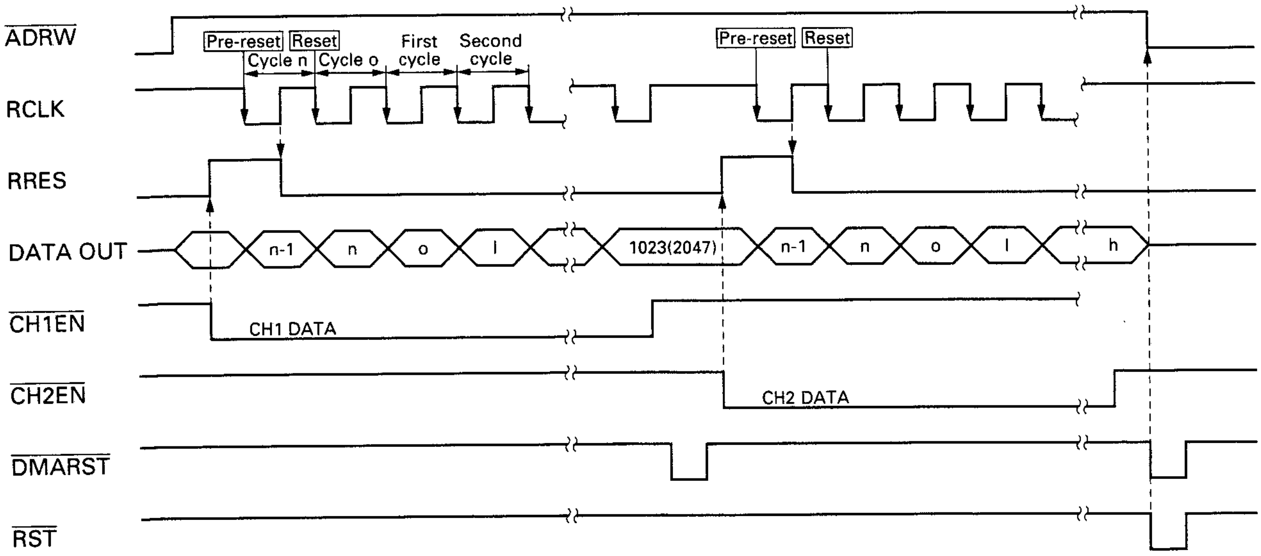

ADRW
RCLK
RRES
DATA OUT
CH1EN
CH2EN
DMARST
RST
Pre-reset
Reset
Cycle n
Cycle o
First cycle
Second cycle
Pre-reset
Reset
n-1
n
o
l
1023(2047)
n-1
n
o
l
h
CH1 DATA
CH2 DATA

Fig. 5 Normal Sampling Read Cycle

# CIRCUIT DESCRIPTION

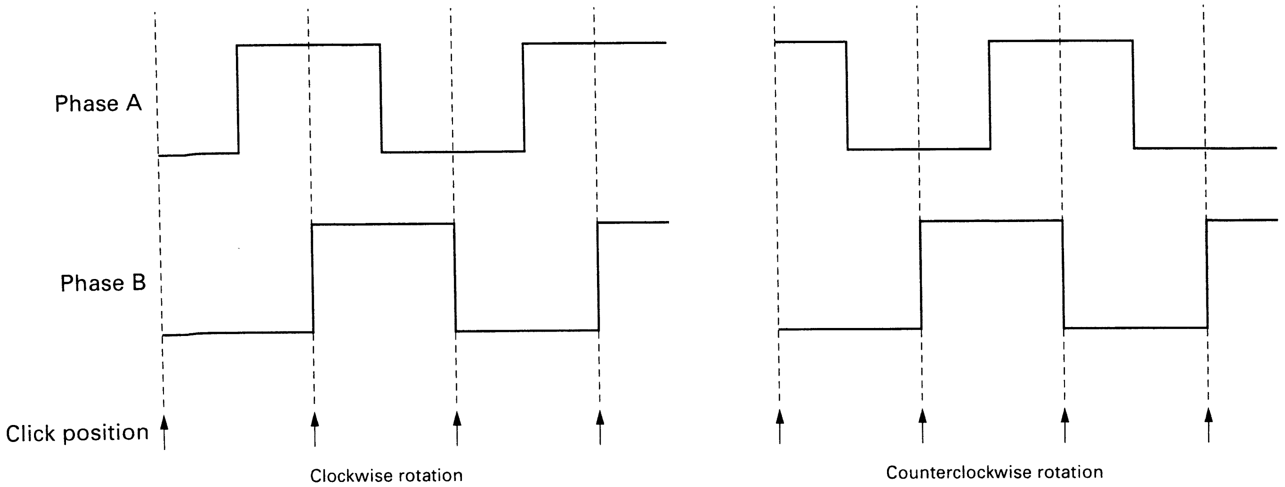

Phase A
Phase B
Click position
Clockwise rotation
Counterclockwise rotation

Fig. 6 Rotary Encoder Pulses

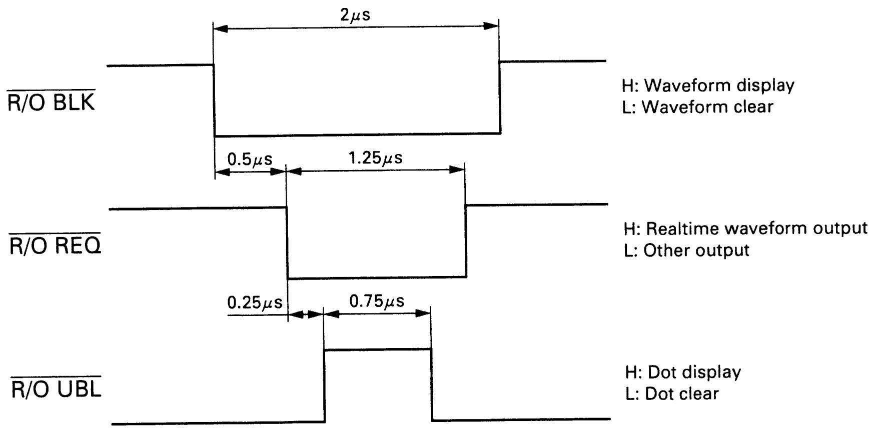
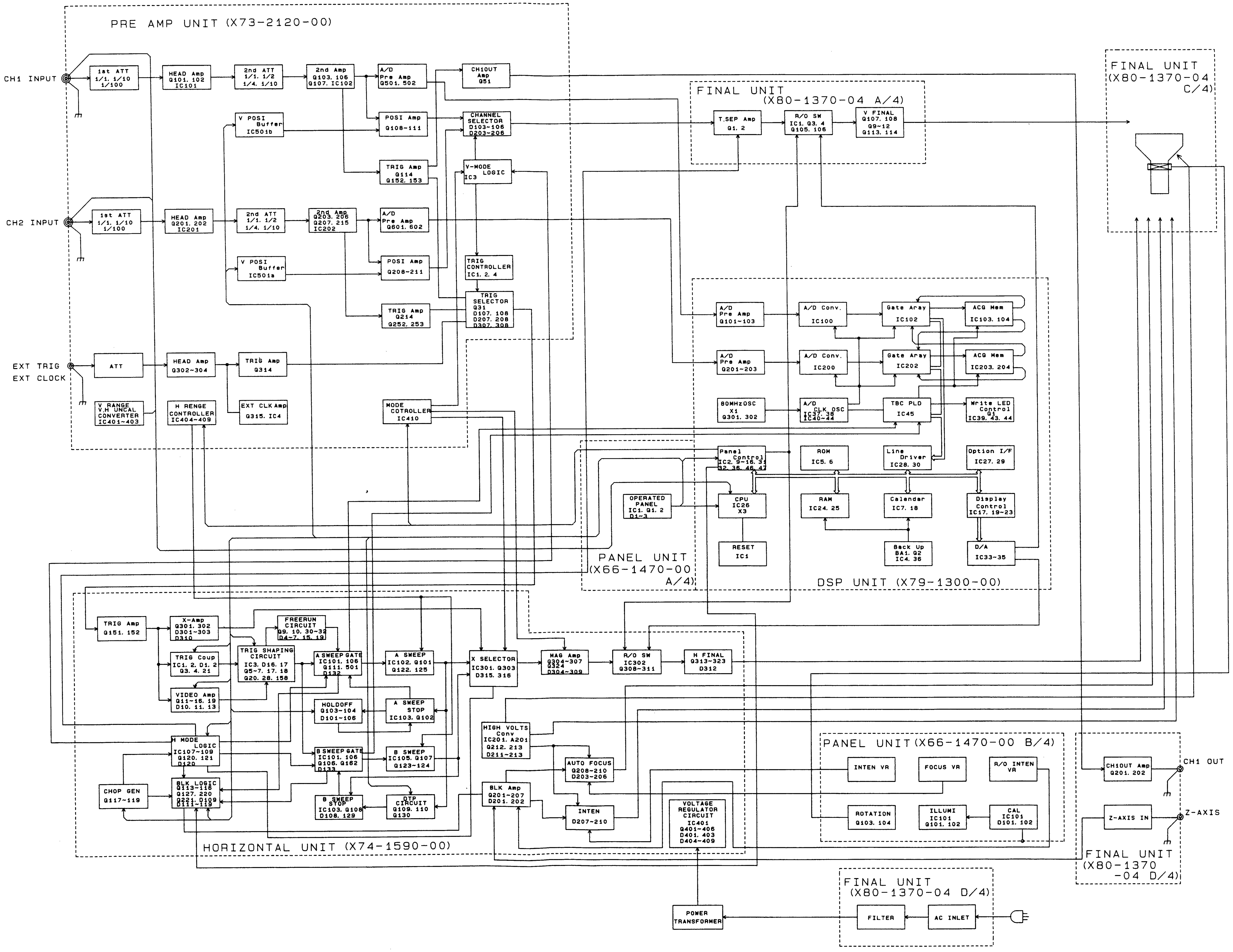
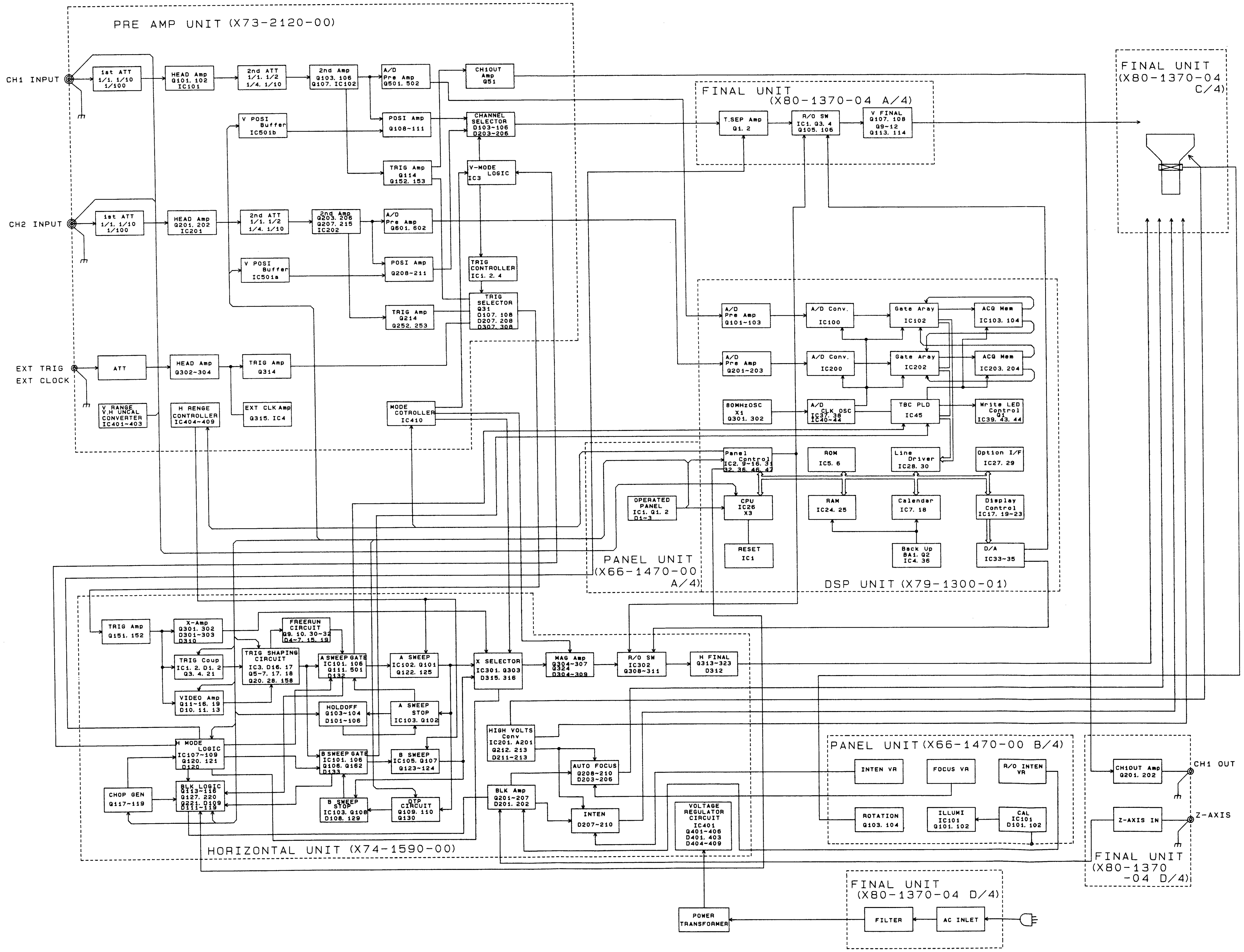

2μs
R/O BLK
H: Waveform display
L: Waveform clear
0.5μs
1.25μs
R/O REQ
H: Realtime waveform output
L: Other output
0.25μs
0.75μs
R/O UBL
H: Dot display
L: Dot clear

Fig. 7 Blanking Timing in Realtime Mode

# DCS-7020 BLOCK DIAGRAM


PRE AMP UNIT (X73-2120-00)
CH1 INPUT
1st ATT 1/1. 1/10 1/100
HEAD Amp Q101. 102 IC101
2nd ATT 1/1. 1/2 1/4. 1/10
2nd Amp Q103. 106 Q107. IC102
A/D Pre Amp Q501. 502
CH1OUT Amp Q51
V POSI Buffer IC501b
POSI Amp Q108~111
CHANNEL SELECTOR D103~106 D203~206
TRIG Amp Q114 Q152. 153
V-MODE LOGIC IC3
CH2 INPUT
1st ATT 1/1. 1/10 1/100
HEAD Amp Q201. 202 IC201
2nd ATT 1/1. 1/2 1/4. 1/10
2nd Amp Q203. 206 Q207. 215 IC202
A/D Pre Amp Q601. 602
V POSI Buffer IC501a
POSI Amp Q208~211
TRIG CONTROLLER IC1. 2. 4
TRIG Amp Q214 Q252. 253
TRIG SELECTOR Q31 D107. 108 D207. 208 D307. 308
EXT TRIG
EXT CLOCK
ATT
HEAD Amp Q302~304
TRIG Amp Q314
V RANGE V.H UNCAL CONVERTER IC401~403
H RENGE CONTROLLER IC404~409
EXT CLK Amp Q315. IC4
MODE COTROLLER IC410
FINAL UNIT (X80-1370-04 A/4)
T.SEP Amp Q1. 2
R/O SW IC1. Q3. 4 Q105. 106
V FINAL Q107. 108 Q9~12 Q113. 114
FINAL UNIT (X80-1370-04 C/4)
A/D Pre Amp Q101~103
A/D Conv. IC100
Gate Aray IC102
ACQ Mem IC103. 104
A/D Pre Amp Q201~203
A/D Conv. IC200
Gate Aray IC202
ACQ Mem IC203. 204
80MHzOSC X1 Q301. 302
A/D CLK OSC IC37. 38 IC40~44
TBC PLD IC45
Write LED Control Q1 IC39. 43. 44
Panel Control IC2. 9~16. 31 32. 36. 46. 47
ROM IC5. 6
Line Driver IC28. 30
Option I/F IC27. 29
OPERATED PANEL IC1. Q1. 2 D1~3
CPU IC26 X3
RAM IC24. 25
Calendar IC7. 18
Display Control IC17. 19~23
RESET IC1
Back Up BA1. Q2 IC4. 36
D/A IC33~35
PANEL UNIT (X66-1470-00 A/4)
DSP UNIT (X79-1300-00)
TRIG Amp Q151. 152
X-Amp Q301. 302 D301~303 D310
FREERUN CIRCUIT Q9. 10. 30~32 D4~7. 15. 19
TRIG Coup IC1. 2. D1. 2 Q3. 4. 21
TRIG SHAPING CIRCUIT IC3. D16. 17 Q5~7. 17. 18 Q20. 28. 158
A SWEEP GATE IC101. 106 Q111. 501 D132
A SWEEP IC102. Q101 Q122. 125
X SELECTOR IC301. Q303 D315. 316
MAG Amp Q304~307 Q324 D304~309
R/O SW IC302 Q308~311
H FINAL Q313~323 D312
VIDEO Amp Q11~16. 19 D10. 11. 13
HOLDOFF Q103~104 D101~106
A SWEEP STOP IC103. Q102
H MODE LOGIC IC107~109 Q120. 121 D120
B SWEEP GATE IC101. 106 Q106. Q162 D133
B SWEEP IC105. Q107 Q123~124
HIGH VOLTS Conv IC201. A201 Q212. 213 D211~213
AUTO FOCUS Q208~210 D203~206
CHOP GEN Q117~119
BLK LOGIC Q113~116 Q127. 220 Q221. D109 D111~119
B SWEEP STOP IC103. Q108 D108. 129
DTP CIRCUIT Q109. 110 Q130
BLK Amp Q201~207 D201. 202
INTEN D207~210
VOLTAGE REGULATOR CIRCUIT IC401 Q401~406 D401. 403 D404~409
HORIZONTAL UNIT (X74-1590-00)
PANEL UNIT (X66-1470-00 B/4)
INTEN VR
FOCUS VR
R/O INTEN VR
ROTATION Q103. 104
ILLUMI IC101 Q101. 102
CAL IC101 D101. 102
CH1OUT Amp Q201. 202
CH1 OUT
Z-AXIS IN
Z-AXIS
FINAL UNIT (X80-1370 -04 D/4)
FINAL UNIT (X80-1370-04 D/4)
FILTER
AC INLET
POWER TRANSFORMER

# DCS-7040 BLOCK DIAGRAM


PRE AMP UNIT (X73-2120-00)
CH1 INPUT
1st ATT 1/1, 1/10 1/100
HEAD Amp Q101, 102 IC101
2nd ATT 1/1, 1/2 1/4, 1/10
2nd Amp Q103, 106 Q107, IC102
A/D Pre Amp Q501, 502
CH1OUT Amp Q51
V POSI Buffer IC501b
POSI Amp Q108~111
CHANNEL SELECTOR D103~106 D203~206
TRIG Amp Q114 Q152, 153
V-MODE LOGIC IC3
CH2 INPUT
1st ATT 1/1, 1/10 1/100
HEAD Amp Q201, 202 IC201
2nd ATT 1/1, 1/2 1/4, 1/10
2nd Amp Q203, 206 Q207, 215 IC202
A/D Pre Amp Q601, 602
V POSI Buffer IC501a
POSI Amp Q208~211
TRIG CONTROLLER IC1, 2, 4
TRIG Amp Q214 Q252, 253
TRIG SELECTOR Q31 D107, 108 D207, 208 D307, 308
EXT TRIG
EXT CLOCK
ATT
HEAD Amp Q302~304
TRIG Amp Q314
V RANGE V.H UNCAL CONVERTER IC401~403
H RENGE CONTROLLER IC404~409
EXT CLK Amp Q315, IC4
MODE COTROLLER IC410
FINAL UNIT (X80-1370-04 A/4)
T.SEP Amp Q1, 2
R/O SW IC1, Q3, 4 Q105, 106
V FINAL Q107, 108 Q9~12 Q113, 114
FINAL UNIT (X80-1370-04 C/4)
A/D Pre Amp Q101~103
A/D Conv. IC100
Gate Aray IC102
ACQ Mem IC103, 104
A/D Pre Amp Q201~203
A/D Conv. IC200
Gate Aray IC202
ACQ Mem IC203, 204
80MHzOSC X1 Q301, 302
A/D CLK OSC IC37, 38 IC40~44
TBC PLD IC45
Write LED Control Q1 IC39, 43, 44
Panel Control IC2, 9~16, 31 32, 36, 46, 47
ROM IC5, 6
Line Driver IC28, 30
Option I/F IC27, 29
OPERATED PANEL IC1, Q1, 2 D1~3
CPU IC26 X3
RAM IC24, 25
Calendar IC7, 18
Display Control IC17, 19~23
RESET IC1
Back Up BA1, Q2 IC4, 36
D/A IC33~35
PANEL UNIT (X66-1470-00 A/4)
DSP UNIT (X79-1300-01)
TRIG Amp Q151, 152
X-Amp Q301, 302 D301~303 D310
FREERUN CIRCUIT Q9, 10, 30~32 D4~7, 15, 19
TRIG Coup IC1, 2, D1, 2 Q3, 4, 21
TRIG SHAPING CIRCUIT IC3, D16, 17 Q5~7, 17, 18 Q20, 28, 158
A SWEEP GATE IC101, 106 Q111, 501 D132
A SWEEP IC102, Q101 Q122, 125
X SELECTOR IC301, Q303 D315, 316
MAG Amp Q304~307 Q324 D304~309
R/O SW IC302 Q308~311
H FINAL Q313~323 D312
VIDEO Amp Q11~16, 19 D10, 11, 13
HOLDOFF Q103~104 D101~106
A SWEEP STOP IC103, Q102
HIGH VOLTS Conv IC201, A201 Q212, 213 D211~213
H MODE LOGIC IC107~109 Q120, 121 D120
B SWEEP GATE IC101, 106 Q106, Q162 D133
B SWEEP IC105, Q107 Q123~124
AUTO FOCUS Q208~210 D203~206
CHOP GEN Q117~119
BLK LOGIC Q113~116 Q127, 220 Q221, D109 D111~119
B SWEEP STOP IC103, Q108 D108, 129
DTP CIRCUIT Q109, 110 Q130
BLK Amp Q201~207 D201, 202
INTEN D207~210
VOLTAGE REGULATOR CIRCUIT IC401 Q401~406 D401, 403 D404~409
HORIZONTAL UNIT (X74-1590-00)
PANEL UNIT (X66-1470-00 B/4)
INTEN VR
FOCUS VR
R/O INTEN VR
ROTATION Q103, 104
ILLUMI IC101 Q101, 102
CAL IC101 D101, 102
CH1OUT Amp Q201, 202
CH1 OUT
Z-AXIS IN
Z-AXIS
FINAL UNIT (X80-1370 -04 D/4)
POWER TRANSFORMER
FINAL UNIT (X80-1370-04 D/4)
FILTER
AC INLET

# ADJUSTMENT

To obtain the best performance, periodically calibrate the unit. Sometimes, only one mode need be calibrated, while at other times, all modes should be calibrated. When one mode is calibrated, it must be noted that the other modes may be affected. When calibrating all modes, perform the calibration in the specified sequence.
The following calibration required an accurate measuring instrument and an insulated adjusting flat blade screwdriver. If they are not available, contact your dealer. For optimum adjustment, turn the power on and warm up the scope sufficiently (more than 30 minutes) before starting.
Before calibrating the scope, check the power supply voltage.

## TEST EQUIPMENT REQUIRED

The following instrument or their equivalent should be used for making adjustment.

| Test Equipment | Model | Minimum Specification |
|---|---|---|
| Digital Multi-Meter | DL-712 (KENWOOD) | Impedance: More than 10 MΩ, Measuring range: 0.2 V to 1000 V |
| Sine-Wave Generator | 651 B (YHP) | Frequency: 10 Hz to 10 MHz, constant voltage over tuning range |
| Sine-Wave Generator | SG-503 (Tektronix) | Frequency: 50 kHz to 100 MHz, Output impedance: 50 Ω, constant voltage over tuning range |
| Square-Wave Generator | PG-506 (Tektronix) | Output signal: 1 kHz, Amplitude: 10 mVp-p to 10 Vp-p, Accuracy: within ±1%, Rise time: 35ns or less<br>100 kHz, Rise time: 1 ns or less |
| Q Meter | 4343B (YHP) | – |
| Color Pattern Generator | CG-921 (KENWOOD) | – |
| Oscilloscope | CS-6040 (KENWOOD) | Sensitivity: more than 1 mV Frequency response: More than 150 MHz |
| Time-Marker Generator | TG-501 (Tektronix) | Time mark: 0.5 s to 0.1μs repetive waveform |
| High-Voltage Probe | – | Input Impedance: 1000 MΩ |
| Termination | – | Impedance: 50 Ω Accuracy: within 3% |
| Termination | – | 3 watts type impedance: 50 Ω |
| Attenuator | – | –20 dB attenuation (50 Ω) |

Table 1

## PREPARATION FOR ADJUSTMENT

**Control Settings**

The control settings listed below must be used for each adjustment procedure.
Exceptions to these settings will be noted as they occur.
After completing a adjustment, return the controls to the following settings.

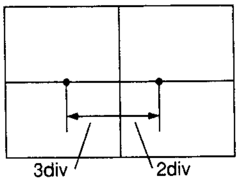
| NAME OF KNOBS | POSITION |
|---|---|
| INTEN | 12 o'clock |
| FOCUS | Optimum position |
| CH1, CH2, ⬍ POSITION | Mechanical center |
| ◄► POSITION | Mechanical center |
| ×10 MAG | OFF |
| VARIABLE, H.VARIABLE (VOLTS/DIV, SWEEP TIME/DIV) | CAL |
| AC-GND-DC (CH1 and CH2) | AC (GND at no signal) |
| VERTICAL MODE | CH1 |
| HORIZONTAL MODE | A |
| TRIGGERING COUPLING | AC |
| TRIGGERING SOURCE | VERT MODE |
| TRIGGERING MODE | AUTO |
| TRIGGERING LEVEL | Mechanical center |
| VOLTS/DIV (CH1 and CH2) | 5 V/DIV |
| A/B SWEEP TIME/DIV | 0.5 s/50 ms |
| CH2 1 NV | OFF |
| HOLD OFF | Fully CCW |
| SLOPE | ⎍ + |

Table 2

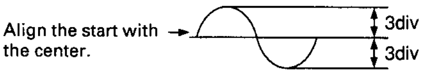
# ADJUSTMENT

| Item | Adjustment | P.C.B. | Procedure |
|---|---|---|---|
| Operating voltage | VR4<br>VR303 | X80-1370<br>X74-1590 | V.MODE : CH1 H.MODE : X-Y<br>AC-DC : GND R/O : OFF<br>VOLTS : 10 mV<br>1) With each POSI, place the spot on the CRT center.<br>2) Adjust VR4 so that the voltage across P105-1 or 3 on X80-1370 and GND is 33.5 [V].<br>3) Adjust VR303 so that the voltage across CN7-1 on X74-1590 and GND is 70 [V].<br>4) Check that the voltage across CN7-4 on X74-1590 and GND is about 70 [V]. |
| Focus Center and ASTIG | VR201<br>VR305 | X74-1590 | V.MODE : CH1 VOLTS : 10 mV<br>AC-DC : GND H.MODE : X-Y<br>1) Move the spot to the CRT center by operating the POSI controls.<br>2) Adjust the spot to the best point with FOCUS on the panel and ASTIG (VR305).<br>3) Set FOCUS on the panel to the 12:00 position and adjust VR201 to move the spot to the best point. |
| Intensity | VR202 | X74-1590 | V.MODE : CH1 VOLTS : 10 mV<br>AC-DC : GND H.MODE : X-Y<br>1) Set INTEN to the 10:00 position.<br>2) Adjust VR202 so that the spot disappears at the 10:00 position. |
| Cusor Y-Gain and POSI | VR3(Gain)<br>VR2(POSI) | X80-1370 | V.MODE : CH1 H.MODE : A<br>AC-DC : GND R/O : ON (△T)<br>VOLTS : 10 mV A.SWEEP : 1 ms<br>1) Ensure that the R/O display to 80 mV when turn the △REF knob fully counterclockwise and △knob fully clockwise.<br>2) Adjust VR3 and VR2 so that the interval between cusor is 8 div.<br>3) Adjust VR2 to make it uniform. |
| Cursor X-Gain and POSI | VR304<br>(Gain)<br>VR306<br>(POSI) | X74-1590 | V.MODE : CH1 H.MODE : A<br>AC-DC : GND R/O : ON (△T)<br>VOLTS : 10 mV A.SWEEP : 1 ms<br>1) Ensure that the R/O display to 10.0 ms when turn the △REF knob fully counterclockwise and △knob fully clockwise.<br>2) Adjust VR304 and VR306 so that the interval between cursor is 10 div.<br>3) Adjust VR306 to make it uniform. |
| CH1 Gain | VR1<br>(10 mV)<br>VR102<br>(1 mV) | X80-1370<br>X73-2120 | V.MODE : CH1 VARI : CAL<br>AC-DC : DC H.MODE : A<br>VOLTS : 10 mV<br>1) Input a 50 mV square wave signal.<br>2) Adjust VR1 so that the amplitude is 5 div. (10 mV range)<br>3) Switch VOLTS to 1 mV and input a 5 mV square wave signal.<br>4) Adjust VR102 so that the amplitude is 5 div. (1 mV range) |
| CH2 Gain | VR207<br>(10 mV)<br>VR202<br>(1 mV) | X73-2120 | V.MODE : CH2 VARI : CAL<br>AC-DC : DC H.MODE : A<br>VOLTS : 10mV<br>1) Input a 50 mV square wave signal.<br>2) Adjust VR207 so that the amplitude is 5 div. (10 mV range)<br>3) Switch VOLTS to 1 mV and input a 5 mV square wave signal.<br>4) Adjust VR202 so that the amplitude is 5 div. (1 mV range) |

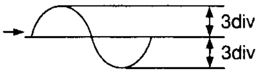
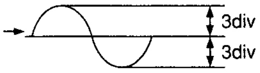
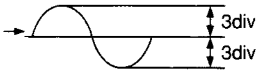
# ADJUSTMENT

| Item | Adjustment | P.C.B. | Procedure |
|---|---|---|---|
| X-Gain | VR308 | X74-1590 | V.MODE : CH2  VARI : CAL<br>AC-DC : DC  H.MODE : X-Y<br>VOLTS : 10 mV<br>1) Input a 50 mV square wave signal to CH2.<br>2) Adjust so that the amplitude is 5 div. (10 mV range)<br>* Make the adjustment to 5 div., at the CRT center.<br><br> |
| CH1 Step ATT Balance | VR103 | X73-2120 | V.MODE : CH1  VOLTS : 5 mV<br>AC-DC : GND  H.MODE : A<br>Adjust so that the luminescent line does not move when VOLTS is switched from 5 mV to 2 mV.<br>* Adjust after switching to 2 mV with reference to the 5 mV position. |
| CH1 VARIABLE Balance | VR104 | X73-2120 | V.MODE : CH1  VOLTS : 5 mV<br>AC-DC : GND  H.MODE : A<br>Adjust by setting VARIABLE to the MIN (fully counterclockwise) position with reference to the MAX (CAL) position.<br>* Ensure that the luminescent line does not move when VARIABLE is switched between MIN ↔ MAX. |
| CH2 Step ATT Balance | VR203 | X73-2120 | V.MODE : CH1  VOLTS : 5 mV<br>AC-DC : GND  H.MODE : A<br>Adjust so that the luminescent line does not move when VOLTS is switched from 5 mV to 2 mV.<br>* Adjust after switching to 2 mV with reference to the 5 mV position. |
| CH2 VARIABLE Balance | VR204 | X73-2120 | V.MODE : CH2  VOLTS: : 5 mV<br>AC-DC : GND  H.MODE : A<br>Adjust by setting VARIABLE to the MIN (fully counterclockwise) position with reference to the MAX (CAL) position.<br>* Ensure that the luminescent line does not move when VARIABLE is switched between MIN ↔ MAX. |
| CH2 INV Balance | VR208 | X73-2120 | V.MODE : CH2  VOLTS : 5 mV<br>AC-DC : GND  H.MODE : A<br>1) Adjust so that the trace does not move when CH2 INV is switched ON-OFF.<br>2) Check CH2 STEP ATT BAL and VARI BAL and, if any is deviated, re-adjust following the adjustment procedure. |
| ADD POSI | VR1 | X73-2120 | V.MODE : CH1 → CH2 → ADD<br>AC-DC : GND<br>VOLTS : 5 mV<br>H.MODE : A<br>1) Move the luminescent line to the CRT center by operating CH1 POSI and set V.MODE to the CH2.<br>2) Move the luminescent line to the CRT center by operating CH2 POSI and set V.MODE to the ADD.<br>3) Move the luminescent line to the CRT center by operating VR1. |

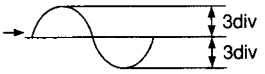
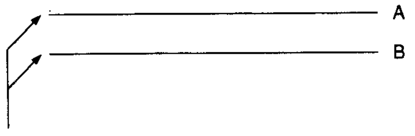
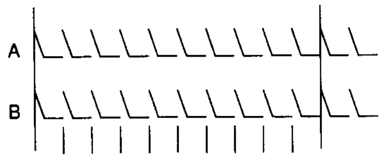
# ADJUSTMENT

| Item | Adjustment | P.C.B. | Procedure |
|---|---|---|---|
| V. POSI Center | VR106<br>(CH1)<br>VR206<br>(CH2) | X73-2120 | V. MODE : CH1 or CH2<br>AC-DC : GND<br>VOLTS : 5 mV<br>H. MODE : A<br>1) Set V. MODE to CH1 and set POSI of CH1 to the 12:00 position.<br>2) Adjust the luminescent line to the center of scale by operating VR106.<br>3) Switch V. MODE to CH2 and set POSI of CH2 to the 12:00 position.<br>4) Adjust the luminescent line to the center of scale by operating VR206. |
| CH1 Waveform Shaping | TC102<br>(0.1 V)<br>TC104<br>(1 V) | X73-2120 | V. MODE : CH1<br>AC-DC : DC<br>VARI : CAL<br>H. MODE : A<br>VOLTS : 10 mV (ideal waveform) → 0.1 V → 1 V<br>1) Input a 1 kHz square wave to the CH1 input.<br>2) Adjust TC102 so that the waveform at 0.1 V range is flat.<br>3) Adjust TC104 so that the waveform at 1 V range is flat. |
| CH2 Waveform Shaping | TC202<br>(0.1 V)<br>TC204<br>(1 V) | X73-2120 | V. MODE : CH2<br>AC-DC : DC<br>VARI : CAL<br>H. MODE : A<br>VOLTS : 10 mV (ideal waveform) → 0.1 V → 1 V<br>1) Input a 1 kHz square wave to the CH2 input.<br>2) Adjust TC202 so that the waveform at 0.1 V range is flat.<br>3) Adjust TC204 so that the waveform at 1 V range is flat. |
| CH1 Input Capacity | TC101<br>(0.1 V)<br>TC103<br>(1 V) | X73-2120 | V. MODE : CH1<br>AC-DC : DC<br>VARI : CAL<br>H. MODE : A<br>VOLTS : 10 mV (reference) → 0.1 V → 1 V<br>1) Connect a capacity meter to the CH1 input.<br>2) Measure the capacity of the 10 mV range. (No more tha 25 p)<br>3) At 0.1 V range, adjust TC101 to obtain the same values as 10 mV.<br>4) At 1 V range, adjust TC103 to obtain the same values as 10 mV. |
| CH2 Input Capacity | TC201<br>(0.1 V)<br>TC203<br>(1 V) | X73-2120 | V. MODE : CH2<br>AC-DC : DC<br>VARI : CAL<br>H. MODE : A<br>VOLTS : 10 mV (reference) → 0.1 V → 1 V<br>1) Connect a capacity meter to the CH2 input.<br>2) Measure the capacity of the 10 mV range. (No more tha 25 p)<br>3) At 0.1 V, adjust TC201 to obtain the same values as 10 mV.<br>4) At 1 V, adjust TC203 to obtain the same values as 10 mV. |
| FIX Level | VR2 | X74-1590 | V. MODE : CH1 H. MODE : A<br>AC-DC : DC SWEEP-TIME : 0.2 ms<br>VOLTS : 0.1 V TRIG. MODE : FIX<br>1) Input 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line.<br>2) Adjust so that the waveform starts from the scale center line when SLOPE is switched between +/−.<br>3) Set the amplitude to 1 div., switch SLOPE to + and −, and ensure that triggering is applied. (If it is not applied, re-adjust now.)<br><br> |

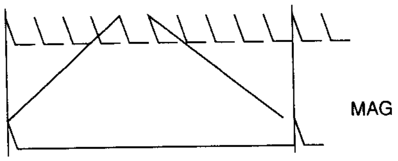
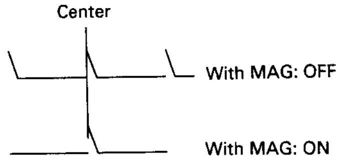
# ADJUSTMENT

| Item | Adjustment | P.C.B. | Procedure |
|---|---|---|---|
| TRIG Level | VR1 | X74-1590 | V. MODE : CH1 H. MODE : A<br>AC-DC : DC SWEEP-TIME : 0. 2 ms<br>VOLTS : 0. 1 V TRIG. MODE : AUTO<br>1) Input 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line.<br>2) Set TRIG LEVEL to the 12: 00 position and adjust so that the waveform starts from the scale center line.<br><br>Align the start with the center.<br> |
| CH1 TRIG DC Coupling | VR105 | X73-2120 | V. MODE : CH1 SWEEP-TIME : 0. 2 ms<br>AC-DC : DC TRIG. MODE : AUTO<br>VOLTS : 0. 1 V COUPLING : AC<br>H. MODE : A<br>1) Input 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line.<br>2) Adjust TRIG LEVEL so that the waveform starts from the scale center line.<br>3) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line.<br><br>Align the start with the center.<br> |
| CH2 TRIG DC Coupling | VR205 | X73-2120 | V. MODE : CH2 SWEEP-TIME : A=0. 2 ms<br>AC-DC : DC TRIG. MODE : AUTO<br>VOLTS : 0. 1 V COUPLING : AC<br>H. MODE : A<br>1) Input 1 kHz sine wave to CH2 and set it so that it extends by 3 div., above and below the scale center line.<br>2) Adjust TRIG LEVEL so that the waveform starts from the scale center line.<br>3) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line.<br><br>Align the start with the center.<br> |

# ADJUSTMENT

| Item | Adjustment | P.C.B. | Procedure |
|---|---|---|---|
| EXT TRIG DC Coupling | VR303 | X73-2120 | V.MODE :CH1 SWEEP-TIME :0.2 ms<br>AC-DC :DC TRIG.MODE :AUTO<br>VOLTS :0.1 V TRIG.SOURCE :EXIT<br>H.MODE :A<br>1) Divide 1 kHz sine wave into two and apply the inputs to CH1 and EXT, and display them for 3 div above and below the scale center line.<br>2) Adjust TRIG LEVEL so that the waveform starts from the scale center line.<br>3) Switch COUPLING to DC and adjust so that the waveform starts form the scale center line.<br> <br>Align the start with the center. |
| TRIG ADD | VR31 | X73-2120 | V.MODE :CH1 → CH2 → ADD SWEEP-TIME :A=0.2 ms<br>VOLTS :0.1 V TRIG.MODE :AUTO<br>AC-DC :DC COUPLING :AC<br>H.MODE :A<br>1) Set the luminescent line of each CH to the scale center position by operating V.POSI.<br>2) Set V.MODE to ADD.<br>3) Input a 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line.<br>4) Adjust TRIG LEVEL so that the waveform starts from the scale center line.<br>5) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line. |
| A/B sweep start points | VR102 | X74-1590 | V.MODE :CH1<br>AC-DC :GND<br>H.MODE :ALT<br>SWEEP-TIME :A=1 ms, B=0.1 ms<br>D.T.POSI :MIN (fully counterclockwise)<br>Adjust so that the start points of A.SWEEP and B.SWEEP are aligned.<br> <br>Start point |
| A, B SWEEP TIME 1 ms | VR403<br>(A, SWEEP)<br>VR402<br>(B, SWEEP) | X73-2120 | H.MODE :ALT<br>D.T.POSI :MIN (fully counterclockwise)<br>SWEEP-TIME :A, B=1 ms<br>B.TRIG'D :ON<br>1) Input a 1 ms marker signal.<br>2) Adjust so that the marker peak and scale coincides at every div.<br> <br>1st peak 11th peak |

# ADJUSTMENT

| Item | Adjustment | P.C.B. | Procedure |
|---|---|---|---|
| MAG GAIN | VR302 | X74-1590 | H. MODE :A<br>SWEEP-TIME : A=1 ms<br>AC-DC :DC<br>B.TRIG'D :ON<br>1) Input a 1 ms marker signal.<br>2) Adjust H. POSI so that the marker peak and scale coincides at every div.<br>3) Switch X10 MAG ON and adjust so that the interval between two peaks is 10 div.<br><br> |
| MAG Center | VR309 | X74-1590 | H. MODE :A<br>SWEEP-TIME : A=1 ms<br>AC-DC :DC<br>1) Input a 5 ms marker signal.<br>2) Switch X10 MAG ON and adjust H. POSI so that the center marker peak is aligned with the scale center.<br>3) Switch X10 MAG OFF and adjust VR 309 so that the center marker peak is aligned with the scale center.<br>4) Adjust by 2) and 3) is repeating a few times.<br>5) After the adjustment, switch MAG between ON-OFF and ensure that the center marker peak does not move.<br><br> |
| H. POSITION<br>X-POSITION | VR301<br>(H. POSI)<br>VR307<br>(X-POSI) | X74-1590 | H. MODE :A or X-Y<br>SWEEP-TIME : A=1 ms<br>1) Set the AC-DC switch to GND. (The marker signal can be left input.)<br>2) Set H. POSI to the 12:00 position.<br>3) Adjust VR301 so that the trace start point is aligned with the left end of scale.<br>4) Set H. MODE to X-Y.<br>5) Adjust VR307 so that the spot comes on the scale center. |
| A, B SWEEP TIME<br>1 µs | TC101<br>(A, SWEEP)<br>TC102<br>(B, SWEEP) | X74-1590 | H. MODE :ALT<br>SWEEP-TIME : A, B=1 µs<br>D.T.POSI : MIN (fully counterclockwise)<br>B.TRIG'D :ON<br>1) Input a 1 µs marker signal.<br>2) Adjust TC101 (A. SWEEP) so that the marker peak and scale coincides at every div.<br>3) Also adjust the B SWEEP time in the same way as above using TC102. |

# ADJUSTMENT

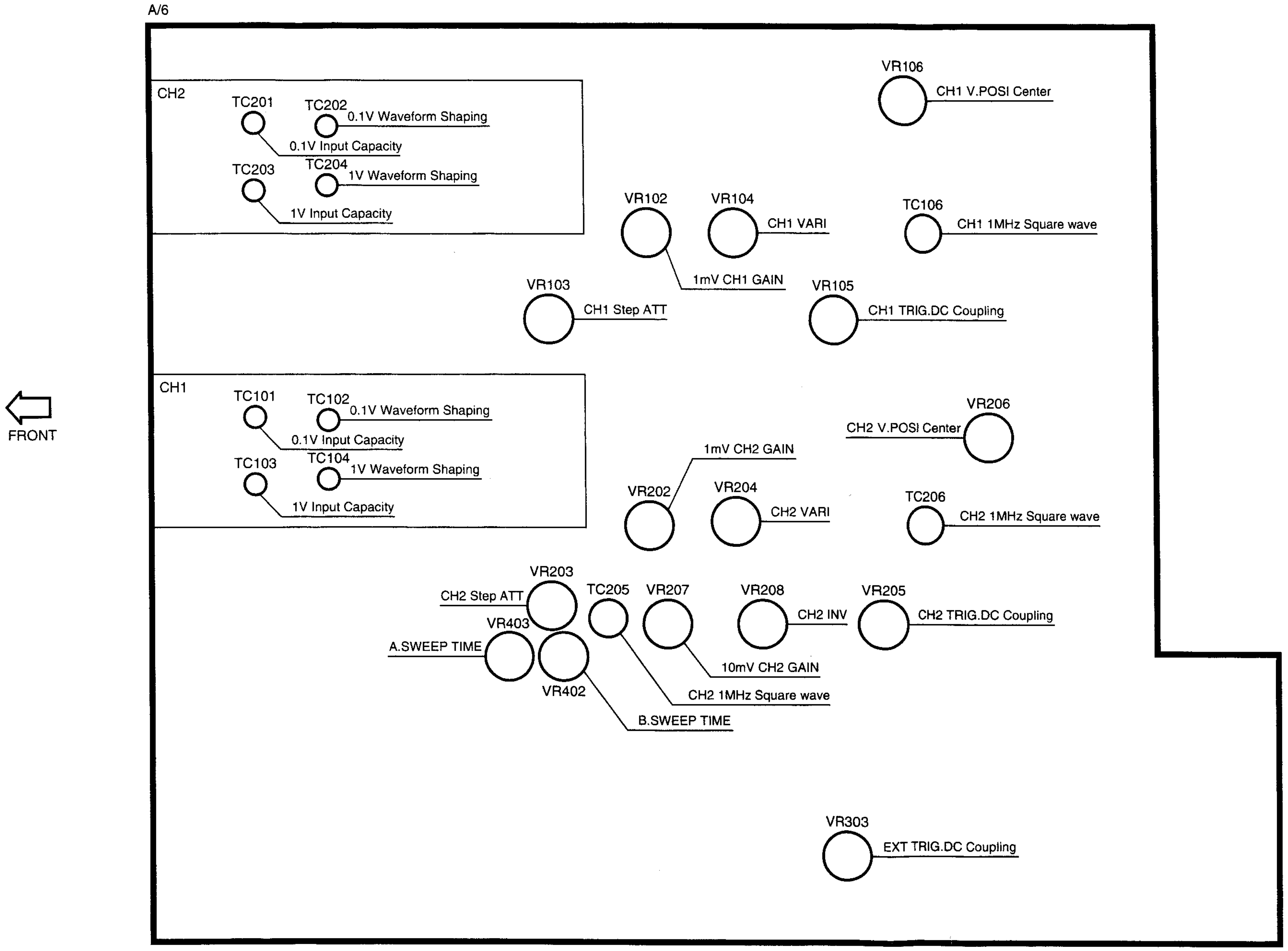
| Item | Adjustment | P.C.B. | Procedure |
|---|---|---|---|
| A SWEEP TIME<br>0. 1 µs | TC303<br>(A, SWEEP) | X74-1590 | H. MODE : A<br>SWEEP-TIME : A=0. 1 µs<br>1) Input a 0. 1 µs marker signal.<br>2) Adjust so that the marker peak and scale coincides at every div. |
| D.T.POSI | VR103<br>(Start)<br>VR104<br>(Stop) | X74-1590 | H. MODE : ALT<br>SWEEP-TIME : A=1 ms, B=10 µs<br>AD-DC : DC<br>1) Turn the COARSE and FINE potentiometers of D.T.POSI control fully counterclockwise.<br>2) Adjust the R/O display to 0.40 ms with FINE.<br>3) Adjust VR103 so that the start of B sweep is aligned with 0. 4 div., of the scale.<br>4) Turn the COARSE and FINE potentiometers of D.T.POSI control fully clockwise.<br>5) Adjust the R/O display to 10.00 ms with FINE.<br>6) Adjust VR104 so that the start of B sweep is aligned with 10.00 div., of the scale.<br> 0.4<br>10.00<br>Start<br>Stop |
| CH1 1 MHz square wave | TC1<br>TC62<br><br>TC106 | X80-1370<br><br><br>X73-2120 | V. MODE : CH1 VOLTS : 10 mV<br>AD-DC : DC H. MODE : A<br>1) Input a 1 MHz square wave to CH1 and set its amplitude to 6 div.<br>2) Adjust the waveform to the best point.<br>3) Check that the overshoot in each range from 5 mV to 0. 1 V is within the specification. |
| CH2 1 MHz square wave | TC205<br>TC206 | X73-2120 | V. MODE : CH2 VOLTS : 10 mV<br>AD-DC : DC H. MODE : A<br>1) Input a 1 MHz square wave to CH2 and set its amplitude to 6 div.<br>2) Adjust the waveform to the best point.<br>3) Check that the overshoot in each range from 5 mV to 0. 1 V is within the specification. |
| STORAGE GAIN | VR102<br>(CH1)<br>VR202<br>(CH2) | X79-1300 | V. MODE : CH1 or CH2 H. MODE : A<br>AC-DC : DC VARI : CAL<br>VOLTS : 10 mV REAL/STORAGE : STORAGE<br>1) Input a 50 mV square wave signal to CH1.<br>2) Adjust VR102 so that the amplitude is 5 div.<br>3) Adjust VR202 so that the amplitude is 5 div.<br>* If the waveforms are not displayed, display them using the following potentiometers.<br>CH1 : X73-2120 : VR502<br>CH2 : X73-2120 : VR602 |

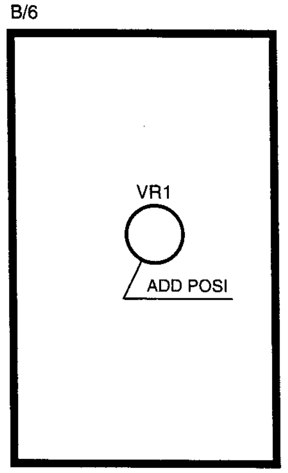
# ADJUSTMENT

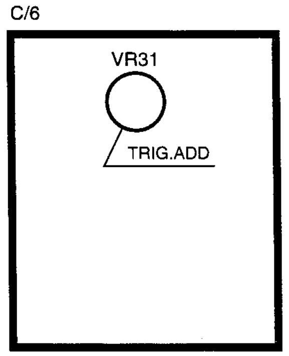
| Item | Adjustment | P.C.B. | Procedure |
|---|---|---|---|
| STORAGE POSI | VR501<br>(CH1 STO POSI GAIN)<br>VR502<br>(CH1 STO POSI)<br>VR601<br>(CH2 STO POSI GAIN)<br>VR602<br>(CH2 STO POSI) | X73-2120 | V. MODE : CH1 or CH2<br>AC-DC : DC<br>VOLTS : 10 mV<br>H. MODE : A<br>TRIG. SOURCE : EXT<br>1) Switch power ON while holding the SINGLE RESET lever down.<br>2) Set the TRIG. MODE to AUTO.<br>3) Apply a 5 V square wave signal into the EXT input.<br>CH1 STO POSI GAIN<br>4) Turn CH2 POSI fully clockwise.<br>5) Display the square wave in REAL mode.<br>6) Switch the modes alternately between STO ↔ REAL and, while adjusting the position with VR502, adjust VR501 to make the amplitude of the STO waveform equal to that of the REAL waveform.<br>CH2 STO POSI GAIN<br>7) Set the V. MODE to CH2.<br>8) Turn CH1 POSI fully clockwise.<br>9) Display the square wave in REAL mode.<br>10) Switch the modes alternately between STO ↔ REAL and, while adjusting the position with VR602, adjust VR601 to make the amplitude of the STO waveform equal to that of the REAL waveform.<br>STO POSI<br>11) Switch power OFF then ON again.<br>12) Display traces on the CRT and, while switching the modes alternately between STOP ↔ REAL, adjust Vr502 and VR602 so that the traces come on the same positions.<br>13) Check by changing the attitude of the DSP unit to vertical and horizontal. If the REAL and STO waveforms are deviated from each other, fine adjust their positions using VR101 (CH1) and VR201 (CH2). |
|  | VR101<br>(CH1 STO POSI [FINE])<br>VR201<br>(CH2 STO POSI [FINE]) | X79-1300 |  |

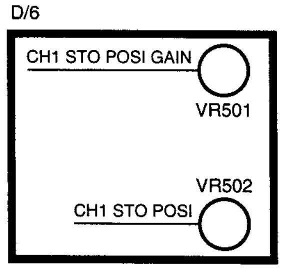
# ADJUSTMENT

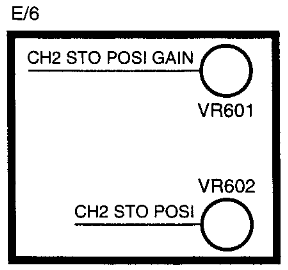
## PRE AMP UNIT (X73-2120-00)


A/6
FRONT
CH2
TC201
TC202
0.1V Waveform Shaping
0.1V Input Capacity
TC203
TC204
1V Waveform Shaping
1V Input Capacity
CH1
TC101
TC102
0.1V Waveform Shaping
0.1V Input Capacity
TC103
TC104
1V Waveform Shaping
1V Input Capacity
VR106
CH1 V.POSI Center
VR102
VR104
CH1 VARI
TC106
CH1 1MHz Square wave
1mV CH1 GAIN
VR103
CH1 Step ATT
VR105
CH1 TRIG.DC Coupling
VR206
CH2 V.POSI Center
1mV CH2 GAIN
VR202
VR204
CH2 VARI
TC206
CH2 1MHz Square wave
VR203
CH2 Step ATT
VR403
A.SWEEP TIME
VR402
TC205
VR207
VR208
CH2 INV
VR205
CH2 TRIG.DC Coupling
10mV CH2 GAIN
CH2 1MHz Square wave
B.SWEEP TIME
VR303
EXT TRIG.DC Coupling


B/6
VR1
ADD POSI

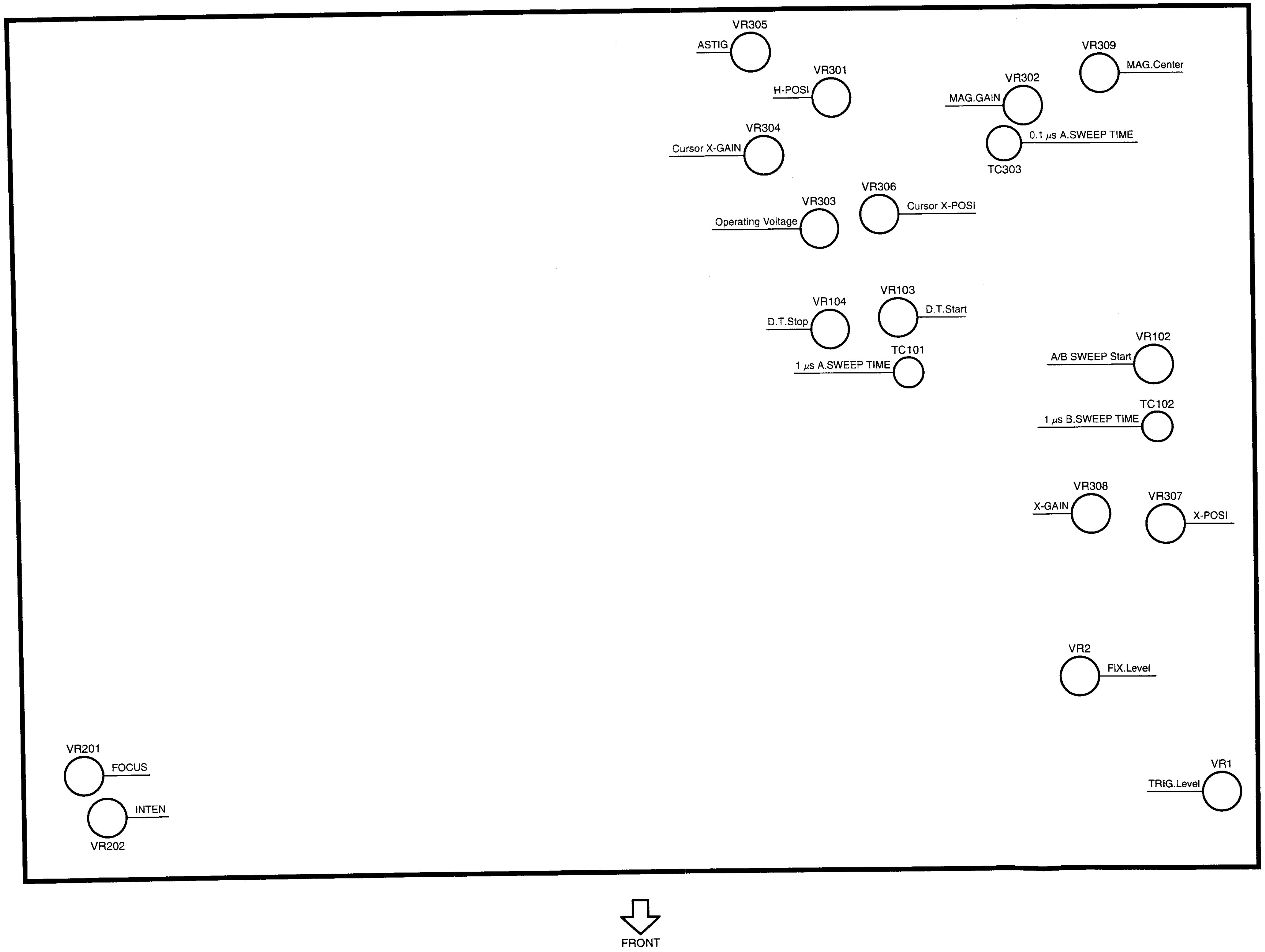

C/6
VR31
TRIG.ADD


D/6
CH1 STO POSI GAIN
VR501
VR502
CH1 STO POSI


E/6
CH2 STO POSI GAIN
VR601
VR602
CH2 STO POSI

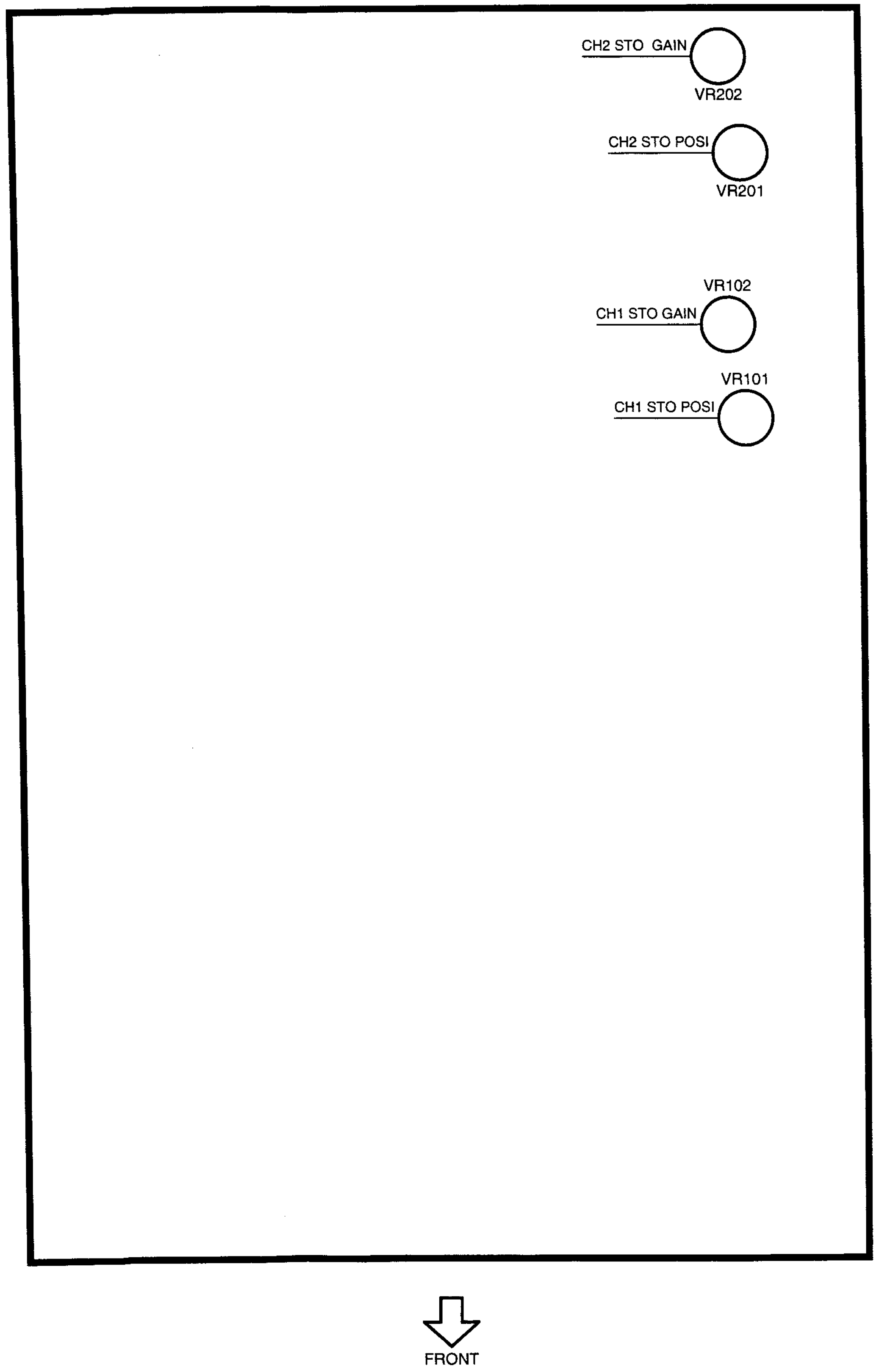
# ADJUSTMENT

## SWEEP UNIT (X74-1590-00)


VR305
ASTIG
VR301
H-POSI
VR309
MAG.Center
VR302
MAG.GAIN
0.1 μs A.SWEEP TIME
TC303
VR304
Cursor X-GAIN
VR306
Cursor X-POSI
VR303
Operating Voltage
VR104
D.T.Stop
VR103
D.T.Start
TC101
1 μs A.SWEEP TIME
VR102
A/B SWEEP Start
TC102
1 μs B.SWEEP TIME
VR308
X-GAIN
VR307
X-POSI
VR2
FIX.Level
VR201
FOCUS
INTEN
VR202
VR1
TRIG.Level
FRONT

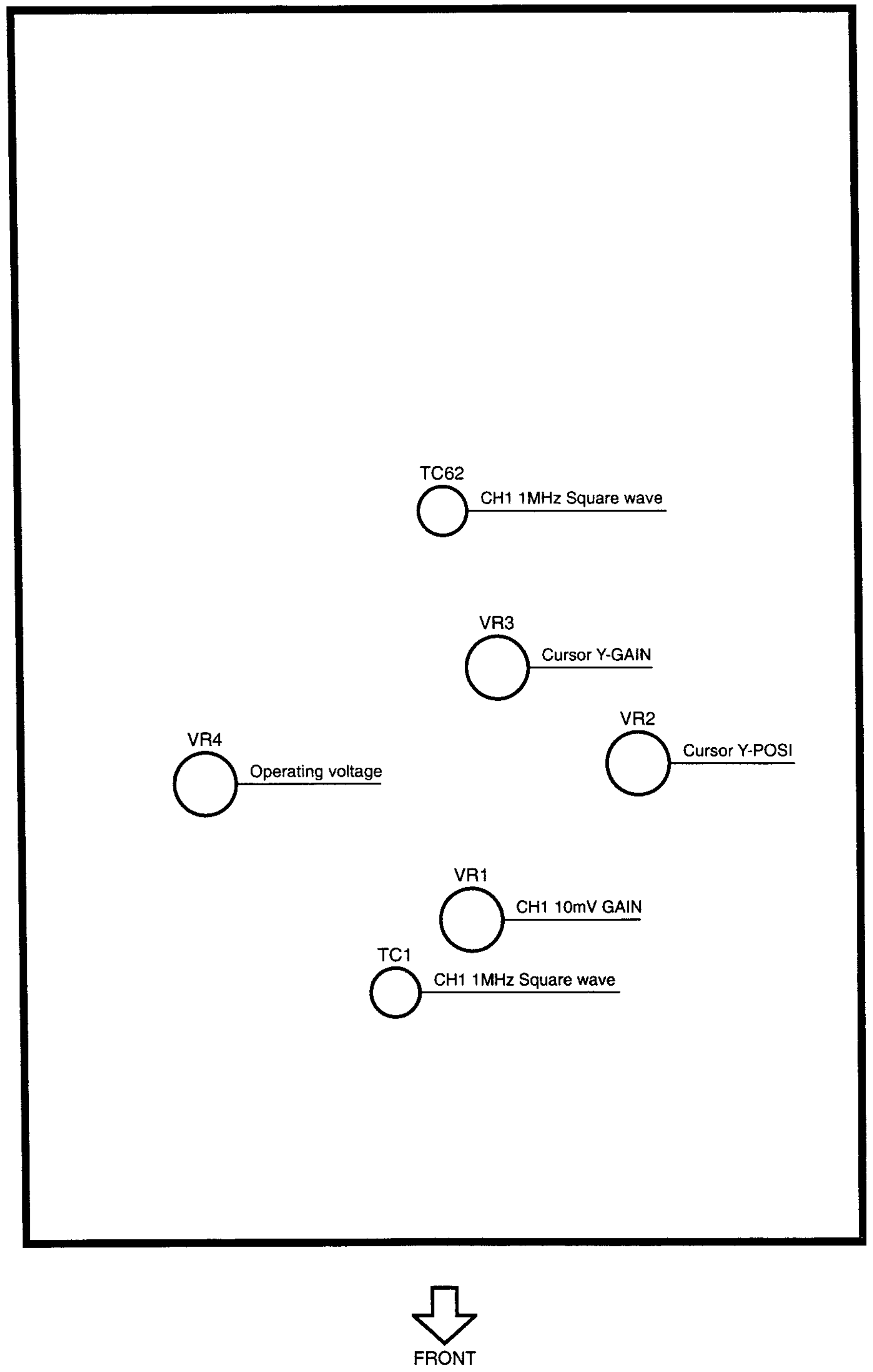
## ADJUSTMENT

### DSP UNIT (X79-1300-0X)


CH2 STO GAIN
VR202
CH2 STO POSI
VR201
VR102
CH1 STO GAIN
VR101
CH1 STO POSI
FRONT

## ADJUSTMENT

### FINAL UNIT (X80-1370-00)


TC62
CH1 1MHz Square wave
VR3
Cursor Y-GAIN
VR2
Cursor Y-POSI
VR4
Operating voltage
VR1
CH1 10mV GAIN
TC1
CH1 1MHz Square wave
FRONT

# TROUBLESHOOTING

When operating the DCS-7020/7040, be sure to use the proper procedure and check all panel settings.
A wrong setting cause abnormal operation from even a good product. For example, observation of a waveform with high noise components is accompanied by jitter. In such a case, the jitter can be corrected by setting the trigger coupling to HFrej.
If there is any function which you do not understand, check out by reading the instruction manual.
If the operation is abnormal even when the operating procedure is correct, remove the top case and bottom panel.

**CAUTION**

HIGH VOLTAGE PARTS ARE INSIDE THE EQUIPMENT. THEY ARE EXTREMELY DANGEROUS.

Check all PC boards to ensure that there is no unplugged connector or soldering defect.
Some problems may be corrected by applying correct adjustment. For example, if the trace moves up and down when the Vertical Variable control is turned, it can be corrected by adjusting the Variable balance. For the adjustment methods, read the descriptions of adjustment procedures.
The description in the troubleshooting section use the same circuit names as those used in the block diagram. Refer to the block diagram when reading the troubleshooting.

First, start with checking the power supply block.
Check the voltages at IC401 on X74-1590.

| pin no. | voltage |
|---|---|
| 1 | +140 |
| 4 | +55 |
| 6 | +12 |
| 8 | −12 |
| 10 | +5 |
| 11 | -8 |

OK (Acceptable): Go to next step.
NG (Unacceptable): There is a problem in the power supply block. Check the regulator circuit

**a: In case no spot is displayed on the CRT in the X-Y mode.**
Check that voltages at pins 1 and 4 of CN7 on the X74-1590.
OK: Check the voltages at pins 1 and 3 of CN5 on the X80-1370.
NG: There is a problem in the vertical amp. (Go to i.)
NG: There is a problem in the horizontal amp. (Go to c.)

**b: Check if the voltage at W18 on X74-1590 is corect.**
OK: There is a problem in the BLK amp.
NG: There is a problem in the HIGH Volts converter.

**c: Short-circuit the bases of Q306 and Q307 on X74-1590.**
A spot is displayed on the CRT:
There is a problem somewhere before the X amp. (Go to d.)
Nothing is displayed on the CRT:
Short the collectors of Q310 and Q311.
A spot is displayed on the CRT:
There is a problem in the MAG amp or R/O SW.
Nothing is displayed on the CRT:
There is a problem in H-FINAL.

**d: Short-circuit the collector of Q151 on X74-1590 with the chassis.**
A spot is displayed on the CRT:
There is a problem in the Vertical block.
Nothing is displayed on the CRT:
There is a problem in the X amp.

**e: In case no trace is displayed on the CRT in the A sweep mode.**
Measure the waveform at pin 12 of IC102 on X74-1590.
OK: Measure every waveform after IC102 to locate the defective position.
NG: Measure the A SWEEP GATE, A SWEEP, A SWEEP STOP and HOLD OFF waveforms to locate the defective position.

**f: In case no trace is displayed on the CRT in the B sweep mode.**
Measure the waveform at pin 12 of IC105 on X74-1590.
OK: Measure every waveform after U105 to locate the defective position.
NG: Measure the B SWEEP GATE, B SWEEP, B SWEEP STOP and DTP circuit waveforms to locate the defective position.

**g: Intensity is not modulated in ALT sweep mode.**
Check the waveform at the collector of Q116 on X74-1590.
OK: There is a problem in INTEN.
NG: There is a problem in the BLK amp.

**h: Triggering cannot be applied.**
Check the waveform at the collector of Q151 on the X74-1590.
OK: Check the waveform at the collector of Q158 on X74-1590.
OK: There is a problem in the Schmitt circuit.
NG: There is a problem in the Trig. Coup.
NG: There is a problem in the trigger selector.

# TROUBLESHOOTING

**i: Trace is not displayed.**
Short-circuit the bases of Q107 and Q108 on X80-1370 and check if a trace is displayed on or near the center.
OK: Short-circuit the bases of Q1 and Q2 on X80-1370 and check if a trace is displayed on o near the center.
OK: There is a problem in X73-2120. Check the defective point by shorting each signal line.
NG: There is a problem in the T.SEP amp or R/O SW on X80-1370.
NG: There is a problem in V. FINAL.

**j: TV synchronization is impossible.**
Check the waveforms of the video amp on X74-1590.
OK: There is a problem in the Schmitt circuit.
NG: There is a problem in the circuitry before the video amp. Check the defective position following the signal flow. Be sure to check both TV-LINE and TV-FRAME.

**k: The channels are not displayed properly.**
Check the outputs from V-MODE LOGIC on X73-2120.
OK: There is a problem in the circuitry before the POSI amp of one of the channels. Check the waveforms.
NG: Check the V-CLK waveform.
OK: There is a problem in the V-MODE LOGIC.
NG: There is a problem in the H-MODE LOGIC on X74-1590.

**l: ADD is not possible.**
There is a problem in channel celector on X73-2120.

**m: CHOP sweep is not possible.**
Check the waveform at the collector of Q118 on X74-1590.
OK: There is a problem in the H-MODE LOGIC.
NG: There is problem in the CHOP generator.

**n: Auto free-run is not possible.**
Check +5V at pin 1 of IC106 on X74-1590.
OK: There is a problem in the A sweep gate.
NG: There is a problem in the free-run circuit.

**o: Characters and STO waveform are not displayed on the CRT.**
- Check the CURSOR MODE SW and R/O INTEN.
- Check the blanking signals at CN527-1, 2, 4 and 5 on the X79-1300.

OK: Check the signals at R/O X at CN527-7 and R/O Y at CN527-5.
If NG, go to the next check item. If OK, check V FINAL or H FINAL.
NG: There is a problem in the display control.

**p: Character and STO waveform are not displayed properly on the CRT.**
- Check if the CPU IC26 on X79-1300 is operates normally.
(Check the conditions of X3, 12 Mhz, IC26 data bus and
- Trace R/O X form the input to output to find if there is any abnormal position. Also check R/O Y from the input to output. (D/A circuit check)

OK: There is a problem in V FINAL or H FINAL.
NG: There is a problem in the display control of the D/A circuitry on X79-1300.

**q: Character data is not displayed properly on the CRT.**
- Trace the Panel control circuit on X79-1300 and its surroundings to fine if there is any abnormal position.

OK: There is a problem in the Panel unit.
NG: There is a problem in the panel control.

**r: The cursor and DTP do not function properly.**
- Check if the cursor and DTP voltages are output properly.

|  | ) | ( | CHECK POINT |
|---|---|---|---|
| Δ | 0V | 4V | IC2-1 |
| ΔREF | 0V | 4V | IC2-2 |
| DTP | 4V | 0V | IC2-5 |

OK: There is a problem in the panel control D/A circuitry on X79-1300.
NG: There is a problem in the Panel unit.

**s: The trace separation does not function properly.**
- Check the operations of IC31, 32 and 36 on X79-1300.

OK: There is a problem in the sweep unit or final unit. Trace signals and identify the abnormal position.
NG: There is a problem in the panel unit or panel control.

**t: Only the STO waveform is abnormal.**
Check if the CPU and the surrounding circuitry are operating, then check the following points.
- Checking pin 29 (Vin) of IC100 (IC200) on X79-1300
  OK: Go to the next check.
  NG: There is a problem in the A/D preamp or the preamp unit.
- Checking pin 2 (CLK) of C100 (IC200) on X79-1300
  OK: Go to the next check.
  NG: There is a problem in the 80 MHz OSC or AD CLK OSC.
- Checking the clock signals output from IC45 on X79-1300
  OK: There is a problem in one of the devices connected to IC45 or in the surroundings.
  NG: There is a problem in IC45.

**u: Abnormality occurs with other function than above.**
Trace the signal path of the defective function referring to the block diagram to locate the defective position.

When all of the troubles have been repaired above, start re-adjustments following the adjustment procedures.

# PARTS LIST

## DCS-7020

### Y7 0-2070-01

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| | A63-0201-03 | PANEL ASS'Y |
| | B41-0710-14 | CAUTION LABEL;HIGH VOLTAGE |
| | B41-2079-14 | CAUTION LABEL |
| | B41-2083-04 | CAUTION LABEL;PL GND |
| | B42-3819-05 | SERIAL NO. PLATE |
| | B42-3820-05 | LABEL;CARTON BOX |
| | B42-6094-04 | CAUTION LABEL;INPUT/OUTPUT |
| | B63-0252-00 | INSTRUCTION MANUAL;JAPANESE |
| | B63-0253-10 | INSTRUCTION MANUAL;ENGLISH |
| | E30-1950-05 | JIS POWER CORD |
| | E30-1951-05 | UL/CSA POWER CORD |
| | E30-1952-05 | CEE POWER CORD |
| | E30-1953-05 | SAA POWER CORD |
| | E30-1963-05 | BS POWER CORD |
| | F05-4016-05 | FUSE(5X20MM) T400MA/250V |
| | F06-1022-05 | FUSE(5X20MM) T1A/250V |
| | G16-0618-04 | SHEET |
| | H10-2888-02 | FOAMED STYREN PAD;FRONT |
| | H10-2889-02 | FOAMED STYREN PAD;REAR |
| | H20-1727-04 | VINYL COVER |
| | H53-0218-13 | CARTON BOX |
| | W01-0406-14 | ADJUSTMENT ROD |
| 1 | A01-4046-02 | CASE;BOTTOM |
| 2 | A01-4047-02 | CASE;TOP |
| 3 | A13-2219-12 | FRAME;RIGHT |
| 4 | A13-2220-02 | FRAME;CENTER |
| 5 | A13-2229-02 | FRAME;LEFT |
| 6 | A21-2448-03 | DECORATIVE PANEL |
| 7 | A21-2449-04 | DECORATIVE PANEL |
| 8 | A22-1307-02 | SUB PANEL |
| 9 | A63-0110-01 | MOLD PANEL;LARGE |
| 10 | A63-0200-12 | MOLD PANEL;SMALL |
| 11 | A83-0079-02 | REAR PANEL |
| 12 | B11-0518-04 | FILTER |
| 13 | B73-0157-04 | MODEL NO. PLATE |
| 14 | D21-0935-04 | EXTENSION SHAFT |
| 15 | E21-0686-04 | TERMINAL;CAL |
| 16 | E23-0552-04 | EARTH TERMINAL |
| 17 | E38-0979-25 | WIRE ASS'Y |
| 18 | E38-1007-15 | WIRE ASS'Y |
| 19 | E38-1167-05 | WIRE ASS'Y |
| 20 | E68-0619-05 | AC SELECTOR |
| 21 | F10-1698-03 | SHIELD PLATE |
| 22 | F11-1206-13 | SHIELD CASE;CRT |
| 23 | F11-1284-03 | SHIELD CASE |
| 24 | F11-1285-03 | SHIELD CASE |
| 25 | F15-0733-04 | FELT (CRT SHIELD) |
| 26 | F15-0769-04 | BLIND PLATE |
| 27 | F20-3013-03 | INSULATOR;LARGE |
| 28 | F20-3014-04 | INSULATOR;SMALL |
| 29 | F29-0528-05 | INSULATOR TUBE |
| 30 | J02-0540-05 | LEG |
| 31 | J19-1653-23 | HOLDER FOR CRT |
| 32 | J21-4853-04 | BRACKET |
| 33 | J21-4854-04 | BRACKET |
| 34 | J21-4855-14 | BRACKET |
| 35 | J42-0558-05 | BUSHING |
| 36 | K01-0561-02 | HANDLE |
| 37 | K21-0920-04 | KNOB;VARI |
| 38 | K23-0818-04 | KNOB;V/DIV |
| 39 | K24-3005-04 | PUSH SW;POWER |
| 40 | K27-0590-04 | PUSH BUTTON;GRAYWHITE |
| 41 | K27-3618-14 | LEVER |
| 42 | K29-0877-04 | KNOB |
| 43 | K29-0894-03 | KNOB |
| 44 | LN222RP | LED;RED |
| 45 | LN322GP | LED;GREEN |
| 46 | L07-1534-05 | POWER TRANSFORMER |
| 47 | L39-0531-05 | ROTATION COIL |
| 48 | S40-2532-05 | POWER SWITCH |
| 49 | W01-0503-04 | REAR RUBBER FOOT/CORD WRAP |
| 50 | X66-1470-00 | PANEL UNIT |
| 51 | X73-2120-00 | PRE AMP UNIT |
| 52 | X74-1590-00 | SWEEP UNIT |
| 53 | X79-1300-00 | DSP UNIT |
| 54 | X80-1370-04 | FINAL UNIT |
| 55 | 150VTM31A | CRT |

## DCS-7040

### Y70-2070-02

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| | A63-0202-03 | PANEL ASS'Y |
| | B41-0710-14 | CAUTION LABEL;HIGH VOLTAGE |
| | B41-2081-14 | CAUTION LABEL |
| | B41-2083-04 | CAUTION LABEL;PL GND |
| | B42-3819-05 | SERIAL NO. PLATE |
| | B42-3820-05 | LABEL;CARTON BOX |
| | B42-6094-04 | CAUTION LABEL;INPUT/OUTPUT |
| | B63-0252-00 | INSTRUCTION MANUAL;JAPANESE |
| | B63-0253-10 | INSTRUCTION MANUAL;ENGLISH |
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| | E30-1951-05 | UL/CSA POWER CORD |
| | E30-1952-05 | CEE POWER CORD |
| | E30-1953-05 | SAA POWER CORD |
| | E30-1963-05 | BS POWER CORD |
| | F05-4016-05 | FUSE(5X20MM) T400MA/250V |
| | F06-1022-05 | FUSE(5X20MM) T1A/250V |
| | G16-0618-04 | SHEET |
| | H10-2888-02 | FOAMED STYREN PAD;FRONT |
| | H10-2889-02 | FOAMED STYREN PAD;REAR |
| | H20-1727-04 | VINYL COVER |
| | H53-0219-13 | CARTON BOX |
| | W01-0406-14 | ADJUSTMENT ROD |
| 1 | A01-4046-02 | CASE;BOTTOM |
| 2 | A01-4047-02 | CASE;TOP |
| 3 | A13-2219-12 | FRAME;RIGHT |
| 4 | A13-2220-02 | FRAME;CENTER |
| 5 | A13-2229-02 | FRAME;LEFT |
| 6 | A21-2448-03 | DECORATIVE PANEL |
| 7 | A21-2449-04 | DECORATIVE PANEL |
| 8 | A22-1307-02 | SUB PANEL |
| 9 | A63-0110-01 | MOLD PANEL;LARGE |
| 10 | A63-0200-12 | MOLD PANEL;SMALL |
| 11 | A83-0079-02 | REAR PANEL |
| 12 | B11-0518-04 | FILTER |
| 13 | B73-0158-04 | MODEL NO. PLATE |
| 14 | D21-0935-04 | EXTENSION SHAFT |
| 15 | E21-0686-04 | TERMINAL;CAL |
| 16 | E23-0552-04 | EARTH TERMINAL |
| 17 | E38-0979-25 | WIRE ASS'Y |
| 18 | E38-1007-15 | WIRE ASS'Y |
| 19 | E38-1167-05 | WIRE ASS'Y |
| 20 | E68-0619-05 | AC SELECTOR |
| 21 | F10-1698-03 | SHIELD PLATE |
| 22 | F11-1206-13 | SHIELD CASE;CRT |
| 23 | F11-1284-03 | SHIELD CASE |
| 24 | F11-1285-03 | SHIELD CASE |
| 25 | F15-0733-04 | FELT (CRT SHIELD) |
| 26 | F15-0769-04 | BLIND PLATE |
| 27 | F20-3013-03 | INSULATOR;LARGE |
| 28 | F20-3014-04 | INSULATOR;SMALL |
| 29 | F29-0528-05 | INSULATOR TUBE |
| 30 | J02-0540-05 | LEG |
| 31 | J19-1653-23 | HOLDER FOR CRT |
| 32 | J21-4853-04 | BRACKET |
| 33 | J21-4854-04 | BRACKET |
| 34 | J21-4855-14 | BRACKET |
| 35 | J42-0558-05 | BUSHING |
| 36 | K01-0561-02 | HANDLE |
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| 43 | K29-0894-03 | KNOB |
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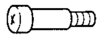
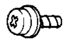
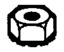
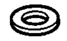
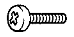
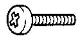
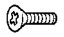
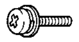
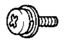
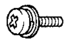
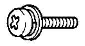
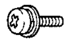
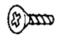
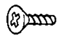
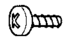
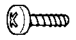
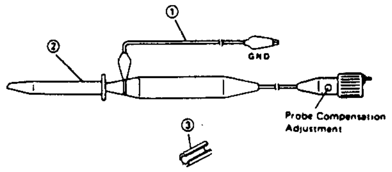
| 47 | L39-0531-05 | ROTATION COIL |
| 48 | S40-2532-05 | POWER SWITCH |
| 49 | W01-0503-04 | REAR RUBBER FOOT/CORD WRAP |
| 50 | X66-1470-00 | PANEL UNIT |
| 51 | X73-2120-00 | PRE AMP UNIT |
| 52 | X74-1590-00 | SWEEP UNIT |
| 53 | X79-1300-01 | DSP UNIT |
| 54 | X80-1370-04 | FINAL UNIT |
| 55 | 150VTM31A | CRT |

# SCREWS

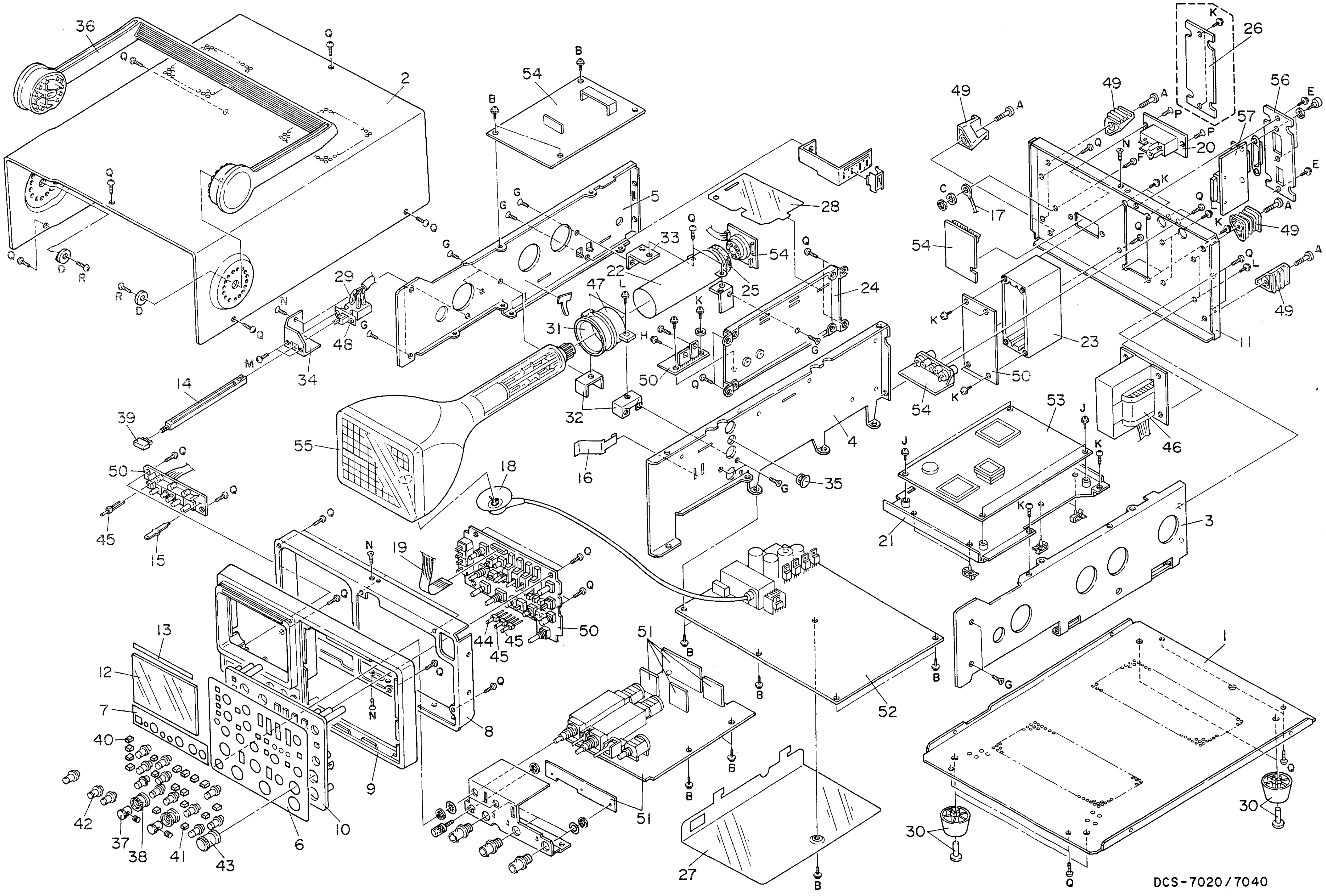
| | Parts No. | Parts Name | Figure |
|---|---|---|---|
| A | N08-0611-04 | SCREW (FOR CORD WRAP) |  |
| B | N09-0739-05 | SCREW, SEMS BINDING TAPTITE (3 x 8) |  |
| C | N14-0622-05 | NUT, WITH TOOTH (M4) |  |
| D | N19-0748-05 | WASHER |  |
| E | N30-3008-41 | SCREW, PAN HD (M3 x 8) |  |
| F | N30-4010-41 | SCREW, PAN HD (M4 x 10) |  |
| G | N32-3008-41 | SCREW, FLAT HD (M3 x 8) |  |
| H | N66-2612-41 | SCREW, SEMS PAN HD (M2.6 x 12) |  |
| J | N66-3006-41 | SCREW, SEMS PAN HD (M3 x 6) |  |
| K | N66-3008-41 | SCREW, SEMS PAN HD (M3 x 8) |  |
| L | N66-4012-41 | SCREW, SEMS PAN HD (M4 x 12) |  |
| M | N67-3008-41 | SCREW, SEMS PAN HD (M3 x 8) |  |
| N | N88-3006-41 | SCREW, FLAT HD TAPTITE (3 x 6) |  |
| P | N88-3008-41 | SCREW, FLAT HD TAPTITE (3 x 8) |  |
| Q | N89-3008-41 | SCREW, BINDING TAPTITE (3 x 8) |  |
| R | N89-3012-41 | SCREW, BINDING TAPTITE (3 x 12) |  |

## MODEL PC-33 (LOW CAPACITY PROBE)



| ITEM | DESCRIPTION | PARTS NO. |
|---|---|---|
| ① | Ground Wire Assembly | E30-1883-08 |
| ② | Retractable Hook Tip | E29-0540-08 |
| ③ | Marker (Orange) | B42-1950-08 |

# DISASSEMBLY


36
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# PARTS LIST

## PANEL UNIT

### X66-1470-00

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | A33-0505-04 | REFLECTOR | | | |
| | E40-0218-05 | PIN CONNECTOR | 2P | | |
| | J73-0389-02 | PCB (UNMOUNTED) | | | |
| C1 | CE04LW1A221M | CAP. ELECTRO | 220 | 20% | 10V |
| C2 | CE04LW1E101M | CAP. ELECTRO | 100 | 20% | 25V |
| C3 | CE04LW1E101M | CAP. ELECTRO | 100 | 20% | 25V |
| C4 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C101 | C90-3228-05 | CAP. ELECTRO | 47 | 20% | 16V |
| C102 | C90-3228-05 | CAP. ELECTRO | 47 | 20% | 16V |
| C103 | CF92FV1H103J | CAP. POLYESTER | 0.01 | 5% | 50V |
| C104 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C105 | C90-3228-05 | CAP. ELECTRO | 47 | 20% | 16V |
| CN511 | E40-7518-05 | PIN CONNECTOR | 6P | | |
| CN523 | E40-7532-05 | PIN CONNECTOR | 23P | | |
| CN524 | E40-7520-05 | PIN CONNECTOR | 30P | | |
| CN529 | E40-7521-05 | PIN CONNECTOR | 30P | | |
| D101 | 1SS132 | DIODE | | | |
| D102 | 1SS132 | DIODE | | | |
| D404 | D3SB20 | DIODE,BRIDGE | | | |
| IC1 | NJM4558L | IC,DUAL OP AMP | | | |
| IC101 | NJM4558L | IC,DUAL OP AMP | | | |
| PL101 | B30-3016-05 | LAMP | | | |
| PL102 | B30-3016-05 | LAMP | | | |
| PL103 | B30-3016-05 | LAMP | | | |
| Q1 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q2 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q101 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q102 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q103 | 2SC1318A(R) | TR. SI, NPN | | | |
| Q104 | 2SA720A(R) | TR. SI, PNP | | | |
| Q407 | 2SB1015(Y) | TR. SI, PNP | | | |
| Q408 | 2SA933S(R,S) | TR. SI, PNP | | | |
| R1 | R90-1182-05 | RES. NETWORK | | | |
| R2 | R90-1182-05 | RES. NETWORK | | | |
| R3 | R90-1182-05 | RES. NETWORK | | | |
| R4 | R90-1182-05 | RES. NETWORK | | | |
| R5 | NO USE | | | | |
| R6 | RN14BK2C2002D | RES. METAL FILM | 20K | 0.5% | 1/6W |
| R7 | RN14BK2C1002D | RES. METAL FILM | 10K | 0.5% | 1/6W |
| R8 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R9 | RN14BK2C2203F | RES. METAL FILM | 220K | 1% | 1/6W |
| R10 | RN14BK2C2202F | RES. METAL FILM | 22K | 1% | 1/6W |
| R11 | RN14BK2C2002D | RES. METAL FILM | 20K | 0.5% | 1/6W |
| R12 | RN14BK2C2002D | RES. METAL FILM | 20K | 0.5% | 1/6W |
| R13 | RN14BK2C1962D | RES. METAL FILM | 19.6K | 0.5% | 1/6W |
| R14 | RD14BB2C822J | RES. CARBON | 8.2K | 5% | 1/6W |
| R15 | RD14BB2C432J | RES. CARBON | 4.3K | 5% | 1/6W |
| R16 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R17 | RD14BB2C621J | RES. CARBON | 620 | 5% | 1/6W |
| R18 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R19 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R20 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R21 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R22 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R23 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R24 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R25 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R26 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R27 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R28 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R29 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R30 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R31 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R32 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R33 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R34 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R35 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R36 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R37 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R38 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R39 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R40 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R41 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R42 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R43 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R44 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R45 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R46 | RD14BB2C361J | RES. CARBON | 360 | 5% | 1/6W |
| R47 | RD14BB2C361J | RES. CARBON | 360 | 5% | 1/6W |
| R48 | RD14BB2C361J | RES. CARBON | 360 | 5% | 1/6W |
| R49 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R50 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R51 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R52 | RD14BB2C393J | RES. CARBON | 39K | 5% | 1/6W |
| R53 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R54 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R55 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R56 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R57 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R58 | RD14BB2C752J | RES. CARBON | 7.5K | 5% | 1/6W |
| R59 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R60 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R61 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R62 | RD14BB2C105J | RES. CARBON | 1M | 5% | 1/6W |
| R101 | RN14BK2C5102F | RES. METAL FILM | 51K | 1% | 1/6W |
| R102 | RN14BK2C3902F | RES. METAL FILM | 39K | 1% | 1/6W |
| R103 | RN14BK2C3902F | RES. METAL FILM | 39K | 1% | 1/6W |
| R104 | RN14BK2C4702F | RES. METAL FILM | 47K | 1% | 1/6W |
| R105 | RN14BK2C4702F | RES. METAL FILM | 47K | 1% | 1/6W |
| R106 | RD14BB2C183J | RES. CARBON | 18K | 5% | 1/6W |
| R107 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R108 | NO USE | | | | |
| R109 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R110 | RN14BK2C6801F | RES. METAL FILM | 6.8K | 1% | 1/6W |
| R111 | RD14BB2C241J | RES. CARBON | 240 | 5% | 1/6W |
| R112 | RN14BK2C6800F | RES. METAL FILM | 680 | 1% | 1/6W |
| R113 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R114 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R115 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R116 | RD14BB2C182J | RES. CARBON | 1.8K | 5% | 1/6W |
| R117 | RD14BB2C123J | RES. CARBON | 12K | 5% | 1/6W |
| R118 | RD14BB2C163J | RES. CARBON | 16K | 5% | 1/6W |
| R119 | RD14BB2C123J | RES. CARBON | 12K | 5% | 1/6W |
| R120 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R420 | R92-1664-05 | RES. FIXED | 18 | 5% | 2W |
| R421 | R92-1664-05 | RES. FIXED | 18 | 5% | 2W |
| S1 | S40-1532-05 | PUSH SWITCH | | | |
| S2 | S40-7411-05 | PUSH SWITCH | | | |
| S3 | S40-7411-05 | PUSH SWITCH | | | |
| S4 | S40-7411-05 | PUSH SWITCH | | | |
| S5 | S40-7411-05 | PUSH SWITCH | | | |
| S6 | S40-1532-05 | PUSH SWITCH | | | |
| S7 | S64-0610-05 | LEVER SWITCH | | | |
| S8 | S64-0610-05 | LEVER SWITCH | | | |
| S9 | S64-0611-05 | LEVER SWITCH | | | |
| S10 | S64-0609-05 | LEVER SWITCH | | | |
| S11 | S40-1532-05 | PUSH SWITCH | | | |
| S12 | S40-1532-05 | PUSH SWITCH | | | |
| S13 | S40-1532-05 | PUSH SWITCH | | | |
| S14 | S40-1532-05 | PUSH SWITCH | | | |
| S15 | S40-7411-05 | PUSH SWITCH | | | |
| S16 | W02-2310-05 | ROTARY ENCODER | | | |
| S17 | W02-0497-05 | ROTARY ENCORDER | | | |
| S18 | S60-0620-05 | ROTARY SWITCH | | | |
| S19 | S60-0621-05 | ROTARY SWITCH | | | |
| VR1 | R05-3521-05 | V.R. | 20KB | | |
| VR2 | R05-3521-05 | V.R. | 20KB | | |
| VR3 | R05-3521-05 | V.R. | 20KB | | |
| VR4 | R05-3521-05 | V.R. | 20KB | | |
| VR5 | R05-3527-05 | V.R. | 20KB | | |
| VR6 | R05-3527-05 | V.R. | 20KB | | |
| VR7 | R05-3527-05 | V.R. | 20KB | | |
| VR8 | R12-0679-05 | RES. SEMI FIXED | 22KB | | |
| VR101 | R05-3521-05 | V.R. | 20KB | | |
| VR102 | R05-3521-05 | V.R. | 20KB | | |
| VR103 | R12-5540-05 | RES. SEMI FIXED | 100KB | | |
| VR104 | R12-5540-05 | RES. SEMI FIXED | 100KB | | |
| VR105 | R05-3521-05 | V.R. | 20KB | | |
| W512 | E38-1165-05 | WIRE ASS'Y | | | |
| W515 | E38-1166-05 | WIRE ASS'Y | | | |
| W516 | E38-1207-05 | WIRE ASS'Y | | | |
| W517 | E38-0996-15 | WIRE ASS'Y | | | |
| W901 | E38-1412-05 | WIRE ASS'Y | | | |

# PARTS LIST

## PRE AMP UNIT

### X73-2120-00

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | A22-1315-03 | SUB PANEL | | | |
| | E21-0667-05 | METAL TERMINAL | | | |
| | E23-0149-05 | GND TERMINAL | | | |
| | E23-1520-05 | EARTH TERMINAL | | | |
| | E38-0983-25 | WIRE ASS'Y | | | |
| | E38-1266-05 | WIRE ASS'Y | | | |
| | E38-1267-05 | WIRE ASS'Y | | | |
| | F01-2318-04 | HEAT SINK;Q1,2 | | | |
| | F10-1590-14 | SHIELD PLATE;ATT | | | |
| | F10-1668-04 | SHIELD PLATE | | | |
| | F10-2505-04 | SHIELD PLATE | | | |
| | J30-0623-04 | SPACER | | | |
| | J73-0393-02 | PCB (UNMOUNTED) | | | |
| | N11-0030-41 | FLANGE NUT | M3 | | |
| | N32-3008-41 | SCREW,FLAT HD | M3X8 | | |
| C7 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C34 | CE04LW0J331M | CAP. ELECTRO | 330 | 20% | 6.3V |
| C35 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C36 | C91-0745-05 | CAP. CERAMIC | 100P | 10% | 50V |
| C37 | C91-0745-05 | CAP. CERAMIC | 100P | 10% | 50V |
| C38 | C91-0745-05 | CAP. CERAMIC | 100P | 10% | 50V |
| C39 | CE04LW1C470M | CAP. ELECTRO | 47 | 20% | 16V |
| C40 | CE04LW1A470M | CAP. ELECTRO | 47 | 20% | 10V |
| C51 | CE04LW1C101M | CAP. ELECTRO | 100 | 20% | 16V |
| C52 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C53 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C54 | CE04LW1C330M | CAP. ELECTRO | 33 | 20% | 16V |
| C57 | CE04HW1C220M | CAP. ELECTRO | 22 | 20% | 16V |
| C58 | CC45FCH1H180J | CAP. CERAMIC | 18P | 5% | 50V |
| C59 | CE04LW1E470M | CAP. ELECTRO | 47 | 20% | 25V |
| C101 | C91-2605-05 | CAP. CERAMIC | 470P | 5% | 50V |
| C102 | C91-2665-05 | CAP. FILM | 0.047 | 10% | 630V |
| C103 | C91-2579-05 | CAP. POLYESTER | 0.01 | 10% | 400V |
| C104 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C105 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C106 | CC45FCH1H220J | CAP. CERAMIC | 22P | 5% | 50V |
| C110 | CC45FCH1H680J | CAP. CERAMIC | 68P | 5% | 50V |
| C111 | NO USE | | | | |
| C112 | CC45FCH1H100D | CAP. CERAMIC | 10P | 0.5P | 50V |
| C113 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C114 | CK45FF1H103Z | CAP. CERAMIC | 0.01 | 10% | 50V |
| C117 | CE04EW1C470M | CAP. ELECTRO | 47 | 20% | 16V |
| C118 | CE04LW1C101M | CAP. ELECTRO | 100 | 20% | 16V |
| C122 | CC45FCH1H820J | CAP. CERAMIC | 82P | 5% | 50V |
| C125 | CF92FV1H332J | CAP. POLYESTER | 3300P | 5% | 50V |
| C130 | CC45FCH1H020C | CAP. CERAMIC | 2P | 0.25P | 50V |
| C201 | C91-2603-05 | CAP. CERAMIC | 330P | 5% | 50V |
| C202 | C91-2665-05 | CAP. FILM | 0.047 | 10% | 630V |
| C203 | C91-2579-05 | CAP. POLYESTER | 0.01 | 10% | 400V |
| C204 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C205 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C210 | CC45FCH1H680J | CAP. CERAMIC | 68P | 5% | 50V |
| C211 | NO USE | | | | |
| C212 | CC45FCH1H100D | CAP. CERAMIC | 10P | 0.5P | 50V |
| C213 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C217 | CE04EW1C470M | CAP. ELECTRO | 47 | 20% | 16V |
| C218 | CE04LW1C101M | CAP. ELECTRO | 100 | 20% | 16V |
| C221 | CE04LW1E470M | CAP. ELECTRO | 47 | 20% | 25V |
| C222 | CC45FCH1H820J | CAP. CERAMIC | 82P | 5% | 50V |
| C225 | CF92FV1H332J | CAP. POLYESTER | 3300P | 5% | 50V |
| C226 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C230 | CC45FCH1H020C | CAP. CERAMIC | 2P | 0.25P | 50V |
| C231 | NO USE | | | | |
| C232 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C233 | CE04LW1C101M | CAP. ELECTRO | 100 | 20% | 16V |
| C300 | C91-2584-05 | CAP. CERAMIC | 1000P | 10% | 400V |
| C301 | CC45FCH1H050C | CAP. CERAMIC | 5P | 0.25P | 50V |
| C302 | CC45FCH1H150J | CAP. CERAMIC | 15P | 5% | 50V |
| C303 | CK45FB1H102K | CAP. CERAMIC | 1000P | 10% | 50V |
| C304 | CC45FCH1H050C | CAP. CERAMIC | 5P | 0.25P | 50V |
| C307 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C308 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C309 | C91-1309-05 | CAP. CERAMIC | 0.01 | 10% | 500V |
| C310 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C313 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C314 | CF92FV1H103J | CAP. POLYESTER | 0.01 | 5% | 50V |
| C315 | NO USE | | | | |
| C316 | CE04LW1E470M | CAP. ELECTRO | 47 | 20% | 25V |
| C319 | CE04LW1C470M | CAP. ELECTRO | 47 | 20% | 16V |
| C323 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C348 | CC45FCH1H080D | CAP. CERAMIC | 8P | 0.5P | 50V |
| C401 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C402 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C403 | CE04LW1C470M | CAP. ELECTRO | 47 | 20% | 16V |
| C404 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C405 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C406 | NO USE | | | | |
| C407 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C410 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C418 | CE04EW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C451 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C452 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C501 | CC45FCH1H060D | CAP. CERAMIC | 6P | 0.5P | 50V |
| C502 | CC45FCH1H060D | CAP. CERAMIC | 6P | 0.5P | 50V |
| C521 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C551 | CC45FCH1H330J | CAP. CERAMIC | 33P | 5% | 50V |
| C552 | CC93FCH1H301J | CAP. CERAMIC | 300P | 5% | 50V |
| C553 | CC45FCH1H120J | CAP. CERAMIC | 12P | 5% | 50V |
| C559 | CC45FCH1H330J | CAP. CERAMIC | 33P | 5% | 50V |
| C560 | CC45FCH1H030C | CAP. CERAMIC | 3P | 0.25P | 50V |
| C561 | CC45FCH1H030C | CAP. CERAMIC | 3P | 0.25P | 50V |
| C601 | CC45FCH1H060D | CAP. CERAMIC | 6P | 0.5P | 50V |
| C602 | CC45FCH1H060D | CAP. CERAMIC | 6P | 0.5P | 50V |
| C621 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C651 | CC45FCH1H330J | CAP. CERAMIC | 33P | 5% | 50V |
| C652 | CC93FCH1H301J | CAP. CERAMIC | 300P | 5% | 50V |
| C653 | CC45FCH1H120J | CAP. CERAMIC | 12P | 5% | 50V |
| C659 | CC45FCH1H330J | CAP. CERAMIC | 33P | 5% | 50V |
| C660 | CC45FCH1H030C | CAP. CERAMIC | 3P | 0.25P | 50V |
| C661 | CC45FCH1H030C | CAP. CERAMIC | 3P | 0.25P | 50V |
| CN13 | E40-7515-05 | PIN CONNECTOR | 3P | | |
| CN509 | E40-3242-05 | PIN CONNECTOR | 7P | | |
| CN512 | E40-7519-05 | PIN CONNECTOR | 4P | | |
| CN525 | E40-3243-05 | PIN CONNECTOR | 8P | | |
| CN531 | E40-7519-05 | PIN CONNECTOR | 4P | | |
| CN532 | E40-7519-05 | PIN CONNECTOR | 4P | | |
| CN541 | E40-7428-05 | PIN CONNECTOR | 9P | | |
| CN542 | E40-7423-05 | PIN CONNECTOR | 4P | | |
| CN543 | E40-7430-05 | PIN CONNECTOR | 11P | | |
| CN544 | E40-7425-05 | PIN CONNECTOR | 6P | | |
| CN545 | E40-7425-05 | PIN CONNECTOR | 6P | | |
| D101 | 1SS132 | DIODE | | | |
| D102 | 1SS132 | DIODE | | | |
| D103 | 1SS132 | DIODE | | | |
| D104 | 1SS132 | DIODE | | | |
| D105 | 1SS132 | DIODE | | | |
| D106 | 1SS132 | DIODE | | | |
| D107 | 1SS132 | DIODE | | | |
| D108 | 1SS132 | DIODE | | | |
| D201 | 1SS132 | DIODE | | | |
| D202 | 1SS132 | DIODE | | | |
| D203 | 1SS132 | DIODE | | | |
| D204 | 1SS132 | DIODE | | | |
| D205 | 1SS132 | DIODE | | | |
| D206 | 1SS132 | DIODE | | | |
| D207 | 1SS132 | DIODE | | | |
| D208 | 1SS132 | DIODE | | | |
| D307 | 1SS132 | DIODE | | | |
| D308 | 1SS132 | DIODE | | | |
| D309 | NO USE | | | | |
| D310 | 1SS132 | DIODE | | | |
| IC1 | KMS01 | IC,LINEAR | | | |
| IC2 | SN74LS158N | IC,QUAD 2-1 DATA SELECTOR/MPX | | | |
| IC3 | SN74LS112AN | IC,DUAL J-K F.F. | | | |
| IC4 | SN74LS02N | IC,QUAD 2-INPUT NOR GATE | | | |
| IC101 | KMC13 | IC,LINEAR | | | |
| IC102 | KMC14 | IC,LINEAR | | | |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| IC201 | KMC13 | IC,LINEAR |
| IC202 | KMC14 | IC,LINEAR |
| IC401 | NJM072L | IC,J-FET INPUT OP AMP |
| IC402 | NO USE | |
| IC403 | NJM4558L | IC,DUAL OP AMP |
| IC404 | TC4053BF | IC,TRIPLE 2-CH MPX/DE-MPX |
| IC405 | TC4053BF | IC,TRIPLE 2-CH MPX/DE-MPX |
| IC406 | TC4053BF | IC,TRIPLE 2-CH MPX/DE-MPX |
| IC407 | TC4053BF | IC,TRIPLE 2-CH MPX/DE-MPX |
| IC408 | TC74HC595AF | IC,8-BIT SHIFT REGISTER/LATCH |
| IC409 | TC74HC595AF | IC,8-BIT SHIFT REGISTER/LATCH |
| IC410 | TC74HC595AF | IC,8-BIT SHIFT REGISTER/LATCH |
| IC501 | NJM4558D | IC,DUAL OP-AMP |
| J1 | E04-0260-05 | COAXIAL CONNECTOR |
| J2 | E04-0260-05 | COAXIAL CONNECTOR |
| J3 | E04-0259-05 | COAXIAL CONNECTOR |
| L1 | L79-0553-05 | FILTER |
| L40 | L40-2201-17 | FERRI INDUCTOR 22UH 10% |
| L51 | L40-4791-17 | FERRI INDUCTOR 4.7UH 10% |
| L52 | L40-4791-17 | FERRI INDUCTOR 4.7UH 10% |
| L301 | L40-2201-17 | FERRI INDUCTOR 22UH 10% |
| L302 | L40-2201-17 | FERRI INDUCTOR 22UH 10% |
| L303 | L40-2201-17 | FERRI INDUCTOR 22UH 10% |
| Q1 | 2SC1740S(R,S) | TR. SI, NPN |
| Q2 | 2SC3779(D) | TR. SI, NPN |
| Q3 | 2SC3779(D) | TR. SI, NPN |
| Q31 | 2SC1740S(R,S) | TR. SI, NPN |
| Q51 | 2SC1923(O) | TR. SI, NPN |
| Q101 | 2SC1923(O) | TR. SI, NPN |
| Q102 | 2SK404(E) | FET, N-CHANNEL |
| Q103 | 2SC1923(O) | TR. SI, NPN |
| Q106 | 2SC3779(D) | TR. SI, NPN |
| Q107 | 2SC3779(D) | TR. SI, NPN |
| Q108 | 2SA1005(K) | TR. SI, PNP |
| Q109 | 2SA1005(K) | TR. SI, PNP |
| Q110 | 2SA1005(K) | TR. SI, PNP |
| Q111 | 2SA1005(K) | TR. SI, PNP |
| Q114 | 2SA1005(K) | TR. SI, PNP |
| Q152 | 2SA1005(K) | TR. SI, PNP |
| Q153 | 2SA1005(K) | TR. SI, PNP |
| Q201 | 2SC1923(O) | TR. SI, NPN |
| Q202 | 2SK404(E) | FET, N-CHANNEL |
| Q203 | 2SC1923(O) | TR. SI, NPN |
| Q206 | 2SC3779(D) | TR. SI, NPN |
| Q207 | 2SC3779(D) | TR. SI, NPN |
| Q208 | 2SA1005(K) | TR. SI, PNP |
| Q209 | 2SA1005(K) | TR. SI, PNP |
| Q210 | 2SA1005(K) | TR. SI, PNP |
| Q211 | 2SA1005(K) | TR. SI, PNP |
| Q214 | 2SA1005(K) | TR. SI, PNP |
| Q215 | 2SC1740S(R,S) | TR. SI, NPN |
| Q252 | 2SA1005(K) | TR. SI, PNP |
| Q253 | 2SA1005(K) | TR. SI, PNP |
| Q254 | 2SC1740S(R,S) | TR. SI, NPN |
| Q302 | 2SC1923(O) | TR. SI, NPN |
| Q303 | 2SK404(E) | FET, N-CHANNEL |
| Q304 | 2SC1923(O) | TR. SI, NPN |
| Q312 | 2SC1923(O) | TR. SI, NPN |
| Q313 | 2SA1005(K) | TR. SI, PNP |
| Q314 | 2SA1005(K) | TR. SI, PNP |
| Q315 | 2SC1923(O) | TR. SI, NPN |
| Q501 | 2SA1005(K) | TR. SI, PNP |
| Q502 | 2SA1005(K) | TR. SI, PNP |
| Q601 | 2SA1005(K) | TR. SI, PNP |
| Q602 | 2SA1005(K) | TR. SI, PNP |
| R2 | RN14BK2C2001F | RES. METAL FILM 2K 1% 1/6W |
| R3 | RN14BK2C2001F | RES. METAL FILM 2K 1% 1/6W |
| R6 | RD14BB2C332J | RES. CARBON 3.3K 5% 1/6W |
| R7 | NO USE | |
| R8 | RN14BK2C3300F | RES. METAL FILM 330 1% 1/6W |
| R9 | RN14BK2C3300F | RES. METAL FILM 330 1% 1/6W |
| R10 | RN14BK2C7500F | RES. METAL FILM 750 1% 1/6W |
| R11 | RN14BK2C7500F | RES. METAL FILM 750 1% 1/6W |
| R12 | R92-1553-05 | RES. METAL FILM 620 5% 1W |
| R17 | RN14BK2C6200F | RES. METAL FILM 620 1% 1/6W |
| R18 | RN14BK2C6200F | RES. METAL FILM 620 1% 1/6W |
| R19 | RN14BK2C51R0F | RES. METAL FILM 51.0 1% 1/6W |
| R20 | RN14BK2C51R0F | RES. METAL FILM 51.0 1% 1/6W |
| R31 | RD14BB2C223J | RES. CARBON 22K 5% 1/6W |
| R32 | NO USE | |
| R33 | RD14BB2C751J | RES. CARBON 750 5% 1/6W |
| R38 | RD14BB2C102J | RES. CARBON 1K 5% 1/6W |
| R39 | RD14BB2C102J | RES. CARBON 1K 5% 1/6W |
| R43 | RD14BB2C100J | RES. CARBON 10 5% 1/6W |
| R52 | RD14BB2C391J | RES. CARBON 390 5% 1/6W |
| R59 | RD14BB2C432J | RES. CARBON 4.3K 5% 1/6W |
| R62 | RD14BB2C301J | RES. CARBON 300 5% 1/6W |
| R63 | RD14BB2C471J | RES. CARBON 470 5% 1/6W |
| R64 | RD14BB2C133J | RES. CARBON 13K 5% 1/6W |
| R65 | RD14BB2C910J | RES. CARBON 91 5% 1/6W |
| R66 | RD14BB2C910J | RES. CARBON 91 5% 1/6W |
| R101 | RD14BB2E220J | RES. CARBON 22 5% 1/4W |
| R102 | RD14BB2C102J | RES. CARBON 1K 5% 1/6W |
| R103 | RD14BB2C220J | RES. CARBON 22 5% 1/6W |
| R104 | RD14BB2C105J | RES. CARBON 1M 5% 1/6W |
| R107 | RD14BB2C684J | RES. CARBON 680K 5% 1/6W |
| R108 | RD14BB2C220J | RES. CARBON 22 5% 1/6W |
| R109 | RD14BB2C132J | RES. CARBON 1.3K 5% 1/6W |
| R110 | NO USE | |
| R111 | RD14BB2C160J | RES. CARBON 16 5% 1/6W |
| R112 | RN14BK2C2700F | RES. METAL FILM 270 1% 1/6W |
| R113 | NO USE | |
| R114 | RD14BB2C220J | RES. CARBON 22 5% 1/6W |
| R115 | RN14BK2C1301F | RES. METAL FILM 1.3K 1% 1/6W |
| R116 | RN14BK2C1301F | RES. METAL FILM 1.3K 1% 1/6W |
| R117 | RN14BK2C3301F | RES. METAL FILM 3.3K 1% 1/6W |
| R118 | RN14BK2C2401F | RES. METAL FILM 2.4K 1% 1/6W |
| R119 | RN14BK2C5100F | RES. METAL FILM 510 1% 1/6W |
| R120 | RD14BB2C301J | RES. CARBON 300 5% 1/6W |
| R121 | RN14BK2C1004F | RES. METAL FILM 1M 1% 1/6W |
| R122 | RD14BB2C103J | RES. CARBON 10K 5% 1/6W |
| R123 | RD14BB2C331J | RES. CARBON 330 5% 1/6W |
| R124 | RD14BB2C103J | RES. CARBON 10K 5% 1/6W |
| R125 | RD14BB2C332J | RES. CARBON 3.3K 5% 1/6W |
| R126 | RD14BB2C273J | RES. CARBON 27K 5% 1/6W |
| R127 | RD14BB2C163J | RES. CARBON 16K 5% 1/6W |
| R128 | RD14BB2C682J | RES. CARBON 6.8K 5% 1/6W |
| R129 | NO USE | |
| R130 | RD14BB2C823J | RES. CARBON 82K 5% 1/6W |
| R131 | NO USE | |
| R132 | RN14BK2C4701F | RES. METAL FILM 4.7K 1% 1/6W |
| R133 | RN14BK2C47R0F | RES. METAL FILM 47 1% 1/6W |
| R134 | RN14BK2C1002F | RES. METAL FILM 10K 1% 1/6W |
| R135 | RN14BK2C1002F | RES. METAL FILM 10K 1% 1/6W |
| R136 | RN14BK2C1301F | RES. METAL FILM 1.3K 1% 1/6W |
| R137 | RN14BK2C1301F | RES. METAL FILM 1.3K 1% 1/6W |
| R138 | RN14BK2C1801F | RES. METAL FILM 1.8K 1% 1/6W |
| R139 | RD14BB2C470J | RES. CARBON 47 5% 1/6W |
| R140 | RD14BB2C470J | RES. CARBON 47 5% 1/6W |
| R141 | RD14BB2C272J | RES. CARBON 2.7K 5% 1/6W |
| R142 | RD14BB2C272J | RES. CARBON 2.7K 5% 1/6W |
| R143 | RD14BB2C101J | RES. CARBON 100 5% 1/6W |
| R144 | RD14BB2C101J | RES. CARBON 100 5% 1/6W |
| R145 | RD14BB2C102J | RES. CARBON 1K 5% 1/6W |
| R146 | RD14BB2C102J | RES. CARBON 1K 5% 1/6W |
| R147 | RN14BK2C1001F | RES. METAL FILM 1K 1% 1/6W |
| R148 | RD14BB2C273J | RES. CARBON 27K 5% 1/6W |
| R149 | RD14BB2C621J | RES. CARBON 620 5% 1/6W |
| R150 | RD14BB2C153J | RES. CARBON 15K 5% 1/6W |
| R151 | RD14BB2C363J | RES. CARBON 36K 5% 1/6W |
| R152 | RD14BB2C223J | RES. CARBON 22K 5% 1/6W |
| R153 | RD14BB2C220J | RES. CARBON 22 5% 1/6W |
| R154 | RD14BB2C220J | RES. CARBON 22 5% 1/6W |
| R155 | RD14BB2C752J | RES. CARBON 7.5K 5% 1/6W |
| R156 | RD14BB2C332J | RES. CARBON 3.3K 5% 1/6W |
| R157 | RD14BB2C101J | RES. CARBON 100 5% 1/6W |
| R158 | RD14BB2C101J | RES. CARBON 100 5% 1/6W |
| R159 | RD14BB2C102J | RES. CARBON 1K 5% 1/6W |
| R160 | RD14BB2C102J | RES. CARBON 1K 5% 1/6W |
| R161 | RD14BB2C431J | RES. CARBON 430 5% 1/6W |
| R162 | RD14BB2C221J | RES. CARBON 220 5% 1/6W |
| R163 | RD14BB2C153J | RES. CARBON 15K 5% 1/6W |
| R164 | RD14BB2C622J | RES. CARBON 6.2K 5% 1/6W |
| R165 | RD14BB2C362J | RES. CARBON 3.6K 5% 1/6W |
| R166 | RD14BB2C101J | RES. CARBON 100 5% 1/6W |
| R170 | R92-1578-05 | RES. LINEAR PCT 3.9K 5% 1/6W |
| R171 | NO USE | |
| R172 | RD14BB2C100J | RES. CARBON 10 5% 1/6W |
| R173 | NO USE | |
| R174 | RD14BB2E201J | RES. CARBON 200 5% 1/4W |
| R175 | RD14BB2C470J | RES. CARBON 47 5% 1/6W |
| R176 | NO USE | |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R177 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R178 | RD14BB2C392J | RES. CARBON | 3.9K | 5% | 1/6W |
| R201 | RD14BB2E220J | RES. CARBON | 22 | 5% | 1/4W |
| R202 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R203 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R204 | RD14BB2C105J | RES. CARBON | 1M | 5% | 1/6W |
| R207 | RD14BB2C684J | RES. CARBON | 680K | 5% | 1/6W |
| R208 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R209 | RD14BB2C132J | RES. CARBON | 1.3K | 5% | 1/6W |
| R210 | NO USE | | | | |
| R211 | RD14BB2C160J | RES. CARBON | 16 | 5% | 1/6W |
| R212 | RN14BK2C2200F | RES. METAL FILM | 220 | 1% | 1/6W |
| R213 | NO USE | | | | |
| R214 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R215 | RN14BK2C1301F | RES. METAL FILM | 1.3K | 1% | 1/6W |
| R216 | RN14BK2C1301F | RES. METAL FILM | 1.3K | 1% | 1/6W |
| R217 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R218 | RN14BK2C2401F | RES. METAL FILM | 2.4K | 1% | 1/6W |
| R219 | RN14BK2C5100F | RES. METAL FILM | 510 | 1% | 1/6W |
| R220 | RD14BB2C301J | RES. CARBON | 300 | 5% | 1/6W |
| R221 | RN14BK2C1004F | RES. METAL FILM | 1M | 1% | 1/6W |
| R222 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R223 | RD14BB2C332J | RES. CARBON | 3.3K | 5% | 1/6W |
| R224 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R225 | RD14BB2C332J | RES. CARBON | 3.3K | 5% | 1/6W |
| R226 | RD14BB2C273J | RES. CARBON | 27K | 5% | 1/6W |
| R227 | RD14BB2C163J | RES. CARBON | 16K | 5% | 1/6W |
| R228 | RD14BB2C682J | RES. CARBON | 6.8K | 5% | 1/6W |
| R229 | NO USE | | | | |
| R230 | RD14BB2C823J | RES. CARBON | 82K | 5% | 1/6W |
| R231 | NO USE | | | | |
| R232 | RN14BK2C4701F | RES. METAL FILM | 4.7K | 1% | 1/6W |
| R233 | RN14BK2C47R0F | RES. METAL FILM | 47 | 1% | 1/6W |
| R234 | RN14BK2C1002F | RES. METAL FILM | 10K | 1% | 1/6W |
| R235 | RN14BK2C1002F | RES. METAL FILM | 10K | 1% | 1/6W |
| R236 | RN14BK2C1301F | RES. METAL FILM | 1.3K | 1% | 1/6W |
| R237 | RN14BK2C1301F | RES. METAL FILM | 1.3K | 1% | 1/6W |
| R238 | RN14BK2C1801F | RES. METAL FILM | 1.8K | 1% | 1/6W |
| R239 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R240 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R241 | RD14BB2C272J | RES. CARBON | 2.7K | 5% | 1/6W |
| R242 | RD14BB2C272J | RES. CARBON | 2.7K | 5% | 1/6W |
| R243 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R244 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R245 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R246 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R247 | RN14BK2C1001F | RES. METAL FILM | 1K | 1% | 1/6W |
| R248 | RD14BB2C273J | RES. CARBON | 27K | 5% | 1/6W |
| R249 | RD14BB2C621J | RES. CARBON | 620 | 5% | 1/6W |
| R250 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R251 | RD14BB2C363J | RES. CARBON | 36K | 5% | 1/6W |
| R252 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R253 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R254 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R255 | RD14BB2C752J | RES. CARBON | 7.5K | 5% | 1/6W |
| R256 | RD14BB2C332J | RES. CARBON | 3.3K | 5% | 1/6W |
| R257 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R258 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R259 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R260 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R261 | RD14BB2C431J | RES. CARBON | 430 | 5% | 1/6W |
| R262 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R263 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R264 | RD14BB2C622J | RES. CARBON | 6.2K | 5% | 1/6W |
| R265 | RD14BB2C362J | RES. CARBON | 3.6K | 5% | 1/6W |
| R266 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R267 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R268 | RD14BB2C361J | RES. CARBON | 360 | 5% | 1/6W |
| R269 | RD14BB2C271J | RES. CARBON | 270 | 5% | 1/6W |
| R270 | R92-1578-05 | RES. LINEAR PCT | 3.9K | 5% | 1/6W |
| R271 | RD14BB2C121J | RES. CARBON | 120 | 5% | 1/6W |
| R272 | RD14BB2C100J | RES. CARBON | 10 | 5% | 1/6W |
| R273 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R274 | RD14BB2E201J | RES. CARBON | 200 | 5% | 1/4W |
| R275 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R276 | NO USE | | | | |
| R277 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R278 | RD14BB2C392J | RES. CARBON | 3.9K | 5% | 1/6W |
| R300 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R301 | RN14BK2C8003F | RES. METAL FILM | 800K | 1% | 1/6W |
| R302 | RN14BK2C2003F | RES. METAL FILM | 200K | 1% | 1/6W |
| R303 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R304 | RD14BB2C684J | RES. CARBON | 680K | 5% | 1/6W |
| R305 | RD14BB2C331J | RES. CARBON | 330 | 5% | 1/6W |
| R306 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R307 | RD14BB2C822J | RES. CARBON | 8.2K | 5% | 1/6W |
| R308 | RD14BB2C302J | RES. CARBON | 3K | 5% | 1/6W |
| R332 | RD14BB2C113J | RES. CARBON | 11K | 5% | 1/6W |
| R333 | RD14BB2C302J | RES. CARBON | 3K | 5% | 1/6W |
| R334 | RD14BB2C122J | RES. CARBON | 1.2K | 5% | 1/6W |
| R335 | RD14BB2C821J | RES. CARBON | 820 | 5% | 1/6W |
| R336 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R337 | RD14BB2C132J | RES. CARBON | 1.3K | 5% | 1/6W |
| R338 | R92-1577-05 | RES. LINEAR PCT | 1K | 5% | 1/6W |

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R344 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R345 | R92-1579-05 | RES. LINEAR PCT | 220 | 5% | 1/6W |
| R346 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R347 | RD14BB2C362J | RES. CARBON | 3.6K | 5% | 1/6W |
| R348 | RD14BB2C911J | RES. CARBON | 910 | 5% | 1/6W |
| R349 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R350 | NO USE | | | | |
| R351 | RN14BK2C5600F | RES. METAL FILM | 560 | 1% | 1/6W |
| R352 | RN14BK2C3002F | RES. METAL FILM | 30K | 1% | 1/6W |
| R353 | RN14BK2C1002F | RES. METAL FILM | 10K | 1% | 1/6W |
| R354 | RD14BB2C681J | RES. CARBON | 680 | 5% | 1/6W |
| R355 | RD14BB2C131J | RES. CARBON | 130 | 5% | 1/6W |
| R356 | RD14BB2C392J | RES. CARBON | 3.9K | 5% | 1/6W |
| R360 | RD14BB2E681J | RES. CARBON | 680 | 5% | 1/4W |
| R361 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R401 | RN14BK2C2201F | RES. METAL FILM | 2.2K | 1% | 1/6W |
| R407 | RN14BK2C2201F | RES. METAL FILM | 2.2K | 1% | 1/6W |
| R429 | RN14BK2C5101F | RES. METAL FILM | 5.1K | 1% | 1/6W |
| R430 | RN14BK2C1003D | RES. METAL FILM | 100K | 0.5% | 1/6W |
| R431 | RN14BK2C5002D | RES. METAL FILM | 50K | 0.5% | 1/6W |
| R432 | RN14BK2C3002D | RES. METAL FILM | 30K | 0.5% | 1/6W |
| R433 | RN14BK2C2002D | RES. METAL FILM | 20K | 0.5% | 1/6W |
| R434 | NO USE | | | | |
| R435 | RN14BK2C1502F | RES. METAL FILM | 15K | 1% | 1/6W |
| R436 | RN14BK2C1003D | RES. METAL FILM | 100K | 0.5% | 1/6W |
| R437 | RN14BK2C5002D | RES. METAL FILM | 50K | 0.5% | 1/6W |
| R438 | RN14BK2C3002D | RES. METAL FILM | 30K | 0.5% | 1/6W |
| R439 | RN14BK2C2002D | RES. METAL FILM | 20K | 0.5% | 1/6W |
| R440 | RN14BK2C2101F | RES. METAL FILM | 2.1K | 1% | 1/6W |
| R441 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R442 | RN14BK2C1002F | RES. METAL FILM | 10K | 1% | 1/6W |
| R443 | RN14BK2C2002F | RES. METAL FILM | 20K | 1% | 1/6W |
| R444 | RN14BK2C4022F | RES. METAL FILM | 40.2K | 1% | 1/6W |
| R445 | RN14BK2C8062F | RES. METAL FILM | 80.6K | 1% | 1/6W |
| R446 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R447 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R450 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R501 | RN14BK2C4300F | RES. METAL FILM | 430 | 1% | 1/6W |
| R502 | RN14BK2C4300F | RES. METAL FILM | 430 | 1% | 1/6W |
| R503 | RN14BK2C1002F | RES. METAL FILM | 10K | 1% | 1/6W |
| R504 | RN14BK2C1002F | RES. METAL FILM | 10K | 1% | 1/6W |
| R505 | RN14BK2C1801F | RES. METAL FILM | 1.8K | 1% | 1/6W |
| R506 | RN14BK2C1801F | RES. METAL FILM | 1.8K | 1% | 1/6W |
| R507 | RN14BK2C6200F | RES. METAL FILM | 620 | 1% | 1/6W |
| R508 | RN14BK2C2201F | RES. METAL FILM | 2.2K | 1% | 1/6W |
| R509 | RN14BK2C2201F | RES. METAL FILM | 2.2K | 1% | 1/6W |
| R512 | RD14BB2C243J | RES. CARBON | 24K | 5% | 1/6W |
| R513 | RD14BB2C123J | RES. CARBON | 12K | 5% | 1/6W |
| R521 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R522 | RD14BB2C752J | RES. CARBON | 7.5K | 5% | 1/6W |
| R523 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R524 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R551 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R552 | RN14BK2E9003D | RES. METAL FILM | 900K | 0.5% | 1/4W |
| R553 | RN14BK2C1113D | RES. METAL FILM | 111K | 0.5% | 1/6W |
| R554 | RD14BB2C510J | RES. CARBON | 51 | 5% | 1/6W |
| R555 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R556 | RD14BB2C271J | RES. CARBON | 270 | 5% | 1/6W |
| R557 | RN14BK2E9903D | RES. METAL FILM | 990K | 0.5% | 1/4W |
| R558 | RN14BK2C1012D | RES. METAL FILM | 10.1K | 0.5% | 1/6W |
| R559 | RD14BB2C130J | RES. CARBON | 13 | 5% | 1/6W |
| R560 | RD14BB2C121J | RES. CARBON | 120 | 5% | 1/6W |
| R561 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R562 | RN14BK2C2000D | RES. METAL FILM | 200 | 0.5% | 1/6W |
| R563 | RN14BK2C1000D | RES. METAL FILM | 100 | 0.5% | 1/6W |
| R564 | RD14BB2C240J | RES. CARBON | 24 | 5% | 1/6W |
| R565 | RN14BK2C60R0D | RES. METAL FILM | 60.0 | 0.5% | 1/6W |
| R566 | RD14BB2C620J | RES. CARBON | 62 | 5% | 1/6W |
| R567 | R92-1667-05 | RES. METAL FILM | 40 | 5% | 1/6W |
| R571 | RN14BK2C8062F | RES. METAL FILM | 80.6K | 1% | 1/6W |
| R572 | RN14BK2C4022F | RES. METAL FILM | 40.2K | 1% | 1/6W |
| R573 | RN14BK2C2002F | RES. METAL FILM | 20K | 1% | 1/6W |
| R574 | RN14BK2C1002F | RES. METAL FILM | 10K | 1% | 1/6W |
| R601 | RN14BK2C4300F | RES. METAL FILM | 430 | 1% | 1/6W |
| R602 | RN14BK2C4300F | RES. METAL FILM | 430 | 1% | 1/6W |
| R603 | RN14BK2C1002F | RES. METAL FILM | 10K | 1% | 1/6W |
| R604 | RN14BK2C1002F | RES. METAL FILM | 10K | 1% | 1/6W |
| R605 | RN14BK2C1801F | RES. METAL FILM | 1.8K | 1% | 1/6W |
| R606 | RN14BK2C1801F | RES. METAL FILM | 1.8K | 1% | 1/6W |
| R607 | RN14BK2C6200F | RES. METAL FILM | 620 | 1% | 1/6W |
| R608 | RN14BK2C2201F | RES. METAL FILM | 2.2K | 1% | 1/6W |
| R609 | RN14BK2C2201F | RES. METAL FILM | 2.2K | 1% | 1/6W |
| R612 | RD14BB2C243J | RES. CARBON | 24K | 5% | 1/6W |
| R613 | RD14BB2C123J | RES. CARBON | 12K | 5% | 1/6W |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| R621 | RD14BB2C153J | RES. CARBON 15K 5% 1/6W |
| R622 | RD14BB2C752J | RES. CARBON 7.5K 5% 1/6W |
| R623 | RD14BB2C103J | RES. CARBON 10K 5% 1/6W |
| R624 | RD14BB2C102J | RES. CARBON 1K 5% 1/6W |
| R651 | RD14BB2C220J | RES. CARBON 22 5% 1/6W |
| R652 | RN14BK2E9003D | RES. METAL FILM 900K 0.5% 1/4W |
| R653 | RN14BK2C1113D | RES. METAL FILM 111K 0.5% 1/6W |
| R654 | RD14BB2C510J | RES. CARBON 51 5% 1/6W |
| R655 | RD14BB2C101J | RES. CARBON 100 5% 1/6W |
| R656 | RD14BB2C271J | RES. CARBON 270 5% 1/6W |
| R657 | RN14BK2E9903D | RES. METAL FILM 990K 0.5% 1/4W |
| R658 | RN14BK2C1012D | RES. METAL FILM 10.1K0.5% 1/6W |
| R659 | RD14BB2C130J | RES. CARBON 13 5% 1/6W |
| R660 | RD14BB2C121J | RES. CARBON 120 5% 1/6W |
| R661 | RD14BB2C101J | RES. CARBON 100 5% 1/6W |
| R662 | RN14BK2C2000D | RES. METAL FILM 200 0.5% 1/6W |
| R663 | RN14BK2C1000D | RES. METAL FILM 100 0.5% 1/6W |
| R664 | RD14BB2C240J | RES. CARBON 24 5% 1/6W |
| R665 | RN14BK2C60R0D | RES. METAL FILM 60.0 0.5% 1/6W |
| R666 | RD14BB2C620J | RES. CARBON 62 5% 1/6W |
| R667 | R92-1667-05 | RES. METAL FILM 40 5% 1/6W |
| R671 | RN14BK2C8062F | RES. METAL FILM 80.6K 1% 1/6W |
| R672 | RN14BK2C4022F | RES. METAL FILM 40.2K 1% 1/6W |
| R673 | RN14BK2C2002F | RES. METAL FILM 20K 1% 1/6W |
| R674 | RN14BK2C1002F | RES. METAL FILM 10K 1% 1/6W |
| R901 | R92-1061-05 | JUMPING RES. ZERO OHM (5MM) |
| R902 | RD14BB2C912J | RES. CARBON 9.1K 5% 1/6W |
| R903 | RD14BB2C912J | RES. CARBON 9.1K 5% 1/6W |
| R904 | R92-0150-05 | JUMPING RES. ZERO OHM(10MM) |
| S101 | S64-0603-15 | LEVER SWITCH |
| S102 | S60-0619-05 | ROTARY SWITCH |
| S201 | S64-0603-15 | LEVER SWITCH |
| S202 | S60-0619-05 | ROTARY SWITCH |
| TC101 | C05-0404-05 | CAP. TRIMMER 10P |
| TC102 | C05-0403-05 | CAP. TRIMMER 6P |
| TC103 | C05-0404-05 | CAP. TRIMMER 10P |
| TC104 | C05-0403-05 | CAP. TRIMMER 6P |
| TC105 | NO USE | |
| TC106 | C05-0469-05 | CAP. TRIMMER 10P |
| TC201 | C05-0404-05 | CAP. TRIMMER 10P |
| TC202 | C05-0403-05 | CAP. TRIMMER 6P |
| TC203 | C05-0404-05 | CAP. TRIMMER 10P |
| TC204 | C05-0403-05 | CAP. TRIMMER 6P |
| TC205 | C05-0470-05 | CAP. TRIMMER 20P |
| TC206 | C05-0469-05 | CAP. TRIMMER 10P |
| TH101 | 112-102-2 | THERMISTOR |
| TH102 | 112-201-2FM | THERMISTOR |
| TH201 | 112-102-2 | THERMISTOR |
| TH202 | 112-201-2FM | THERMISTOR |
| VR1 | R12-0882-05 | RES. SEMI FIXED 100 B |
| VR31 | R12-0880-05 | RES. SEMI FIXED 220 |
| VR102 | R12-0885-05 | RES. SEMI FIXED 100 |
| VR103 | R12-0680-05 | RES. SEMI FIXED 47K |
| VR104 | R12-0885-05 | RES. SEMI FIXED 100 |
| VR105 | R12-0679-05 | RES. SEMI FIXED 22KB |
| VR106 | R12-0679-05 | RES. SEMI FIXED 22KB |
| VR202 | R12-0885-05 | RES. SEMI FIXED 100 |
| VR203 | R12-0680-05 | RES. SEMI FIXED 47K |
| VR204 | R12-0885-05 | RES. SEMI FIXED 100 |
| VR205 | R12-0679-05 | RES. SEMI FIXED 22KB |
| VR206 | R12-0679-05 | RES. SEMI FIXED 22KB |
| VR207 | R12-0885-05 | RES. SEMI FIXED 100 |
| VR208 | R12-0885-05 | RES. SEMI FIXED 100 |
| VR303 | R12-0679-05 | RES. SEMI FIXED 22KB |
| VR401 | R05-2515-05 | V.R. 10K |
| VR402 | R12-3599-05 | RES. SEMI FIXED 22K |
| VR403 | R12-3599-05 | RES. SEMI FIXED 22K |
| VR501 | R12-3595-05 | RES. SEMI FIXED 10KB |
| VR502 | R12-3596-05 | RES. SEMI FIXED 22KB |
| VR601 | R12-3595-05 | RES. SEMI FIXED 10KB |
| VR602 | R12-3596-05 | RES. SEMI FIXED 22KB |
| W4 | E38-1169-05 | WIRE ASS'Y;3P |
| W301 | E38-0987-15 | WIRE ASS'Y;2P |
| W401 | E38-0984-15 | WIRE ASS'Y;2P |
| W502 | E38-1205-05 | WIRE ASS'Y;2P |
| W506 | E38-0985-05 | WIRE ASS'Y;2P |
| W510 | E38-1168-15 | WIRE ASS'Y;12P |

## SWEEP UNIT

## X74-1590-00

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| | E23-0149-05 | GND TERMINAL |
| | E23-0557-14 | EARTH LUG,THERMAL FUSE |
| | E23-1520-05 | EARTH TERMINAL |
| | E31-2170-05 | JUMPING WIRE |
| | F01-0867-05 | HEAT SINK,HIGH VOLTAGE |
| | F01-2337-05 | HEAT SINK |
| | J73-0395-02 | PCB (UNMOUNTED) |
| | N09-0623-04 | SCREW,SEMS PAN HD M3X8 |
| A201 | W02-2256-05 | HIGH VOLTAGE BLOCK |
| C1 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C2 | C91-2538-05 | CAP. FILM 0.1 10% 63V |
| C3 | C91-2595-05 | CAP. CERAMIC 68P 5% 50V |
| C4 | CF92FV1H223J | CAP. POLYESTER 0.022 5% 50V |
| C5 | C91-2596-05 | CAP. CERAMIC 82P 5% 50V |
| C6 | CC45FCH1H470J | CAP. CERAMIC 47P 5% 50V |
| C7 | CC45FCH1H010C | CAP. CERAMIC 1P 0.25P 50V |
| C8 | CC45FCH1H040C | CAP. CERAMIC 4P 0.25P 50V |
| C9 | C91-2538-05 | CAP. FILM 0.1 10% 63V |
| C10 | CK45FB1H222K | CAP. CERAMIC 2200P 10% 50V |
| C11 | C91-0757-05 | CAP. CERAMIC 1000P 10% 50V |
| C12 | C91-2538-05 | CAP. FILM 0.1 10% 63V |
| C13 | CK45FF1H103Z | CAP. CERAMIC 0.01 10% 50V |
| C14 | CC45FCH1H101J | CAP. CERAMIC 100P 5% 50V |
| C15 | NO USE | |
| C16 | CE04LW1E100M | CAP. ELECTRO 10 20% 25V |
| C17 | CE04LW1H010M | CAP. ELECTRO 1 20% 50V |
| C18 | CE04LW1H010M | CAP. ELECTRO 1 20% 50V |
| C19 | CF92FV1H682J | CAP. POLYESTER 6800P 5% 50V |
| C20 | CF92FV1H222J | CAP. POLYESTER 2200P 5% 50V |
| C21 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C22 | CE04HW1H010M | CAP. ELECTRO 1 20% 50V |
| C23 | CE04HW1H010M | CAP. ELECTRO 1 20% 50V |
| C24 | NO USE | |
| C25 | CE04LW1E100M | CAP. ELECTRO 10 20% 25V |
| C26 | CE04HW1H2R2M | CAP. ELECTRO 2.2 20% 50V |
| C27 | CE04HW1H2R2M | CAP. ELECTRO 2.2 20% 50V |
| C28 | CE04HW1E220M | CAP. ELECTRO 22 20% 25V |
| C29 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C30 | C91-2538-05 | CAP. FILM 0.1 10% 63V |
| C31 | CE04LW0J331M | CAP. ELECTRO 330 20% 6.3V |
| C32 | CE04EW1A101M | CAP. ELECTRO 100 20% 10V |
| C33 | CC45FCH1H020C | CAP. CERAMIC 2P 0.25P 50V |
| C34 | CE04LW1C331M | CAP. ELECTRO 330 20% 16V |
| C35 | CE04LW1C100M | CAP. ELECTRO 10 20% 16V |
| C36 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C37 | CC45FSL1H221J | CAP. CERAMIC 220P 5% 50V |
| C38 | C91-0745-05 | CAP. CERAMIC 100P 10% 50V |
| C39 | C91-0745-05 | CAP. CERAMIC 100P 10% 50V |
| C101 | CC45FCH1H470J | CAP. CERAMIC 47P 5% 50V |
| C102 | CC45FCH1H470J | CAP. CERAMIC 47P 5% 50V |
| C103 | CF92FV1H332J | CAP. POLYESTER 3300P 5% 50V |
| C104 | C91-2582-05 | CAP. POLYESTER 0.47 5% 100V |
| C105 | CC45FCH1H330J | CAP. CERAMIC 33P 5% 50V |
| C106 | CK45FB1H102K | CAP. CERAMIC 1000P 10% 50V |
| C107 | CE04HW1H2R2M | CAP. ELECTRO 2.2 20% 50V |
| C108 | CC45FCH1H101J | CAP. CERAMIC 100P 5% 50V |
| C109 | C91-2538-05 | CAP. FILM 0.1 10% 63V |
| C110 | CC45FCH1H470J | CAP. CERAMIC 47P 5% 50V |
| C111 | CF92FV1H104J | CAP. POLYESTER 0.1 5% 50V |
| C112 | CC45FCH1H330J | CAP. CERAMIC 33P 5% 50V |
| C113 | CC45FCH1H101J | CAP. CERAMIC 100P 5% 50V |
| C114 | CE04LW1A220M | CAP. ELECTRO 22 20% 10V |
| C115 | C91-2604-05 | CAP. CERAMIC 390P 5% 50V |
| C116 | C91-2598-05 | CAP. CERAMIC 120P 5% 50V |
| C117 | CC45FCH1H680J | CAP. CERAMIC 68P 5% 50V |
| C118 | CC45FCH1H680J | CAP. CERAMIC 68P 5% 50V |
| C119 | NO USE | |
| C120 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C121 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C122 | CC45FCH1H390J | CAP. CERAMIC 39P 5% 50V |
| C123 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C124 | C91-2582-05 | CAP. POLYESTER 0.47 5% 100V |
| C125 | CE04LW0J331M | CAP. ELECTRO 330 20% 6.3V |
| C126 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C127 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C128 | C91-2538-05 | CAP. FILM 0.1 10% 63V |
| C129 | C91-0769-05 | CAP. CERAMIC 0.01 20% 16V |
| C132 | CC45FCH1H030C | CAP. CERAMIC 3P 0.25P 50V |
| C133 | CE04LW1C470M | CAP. ELECTRO 47 20% 16V |
| C134 | NO USE | |
| C135 | CE04LW0J331M | CAP. ELECTRO 330 20% 6.3V |
| C136 | CE04LW0J331M | CAP. ELECTRO 330 20% 6.3V |
| C137 | CE04LW0J331M | CAP. ELECTRO 330 20% 6.3V |
| C138 | CE04LW1C101M | CAP. ELECTRO 100 20% 16V |
| C139 | CC45FSL1H331J | CAP. CERAMIC 330P 5% 50V |
| C140 | CC45FCH1H470J | CAP. CERAMIC 47P 5% 50V |
| C141 | CC45FCH1H470J | CAP. CERAMIC 47P 5% 50V |
| C142 | CC45FCH1H470J | CAP. CERAMIC 47P 5% 50V |
| C143 | NO USE | |
| C144 | C91-0737-05 | CAP. CERAMIC 47P 5% 50V |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| C145 | CE04LW1C100M | CAP. ELECTRO | 10 | 20% | 16V |
| C146 | CC45FSL1H030C | CAP. CERAMIC | 3P | 0.25P | 50V |
| C150 | CE04LW1A470M | CAP. ELECTRO | 47 | 20% | 10V |
| C158 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C179 | CK45FB1H152K | CAP. CERAMIC | 1500P | 10% | 50V |
| C201 | CC45FCH1H070D | CAP. CERAMIC | 7P | 0.5P | 50V |
| C202 | NO USE | | | | |
| C203 | CC45FCH1H120J | CAP. CERAMIC | 12P | 5% | 50V |
| C204 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C205 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C206 | NO USE | | | | |
| C207 | CK45FB2H472K | CAP. CERAMIC | 4700P | 10% | 500V |
| C208 | CE04EW2E010M | CAP. ELECTRO | 1 | 20% | 250V |
| C209 | CC45FCH2H020C | CAP. CERAMIC | 2P | 0.25P | 500V |
| C210 | CK45FB2H472K | CAP. CERAMIC | 4700P | 10% | 500V |
| C211 | CE04EW2E010M | CAP. ELECTRO | 1 | 20% | 250V |
| C212 | CE04EW2E010M | CAP. ELECTRO | 1 | 20% | 250V |
| C213 | CK45FB2H102K | CAP. CERAMIC | 1000P | 10% | 500V |
| C214 | CK45FB2H102K | CAP. CERAMIC | 1000P | 10% | 500V |
| C215 | C91-1317-05 | CAP. CERAMIC | 0.01 | 80/-20% | 2K |
| C216 | C91-1317-05 | CAP. CERAMIC | 0.01 | 80/-20% | 2K |
| C217 | C91-1317-05 | CAP. CERAMIC | 0.01 | 80/-20% | 2K |
| C218 | CE04EW2E010M | CAP. ELECTRO | 1 | 20% | 250V |
| C219 | NO USE | | | | |
| C220 | C91-1317-05 | CAP. CERAMIC | 0.01 | 80/-20% | 2K |
| C221 | C91-1317-05 | CAP. CERAMIC | 0.01 | 80/-20% | 2K |
| C222 | CE04LW1E221M | CAP. ELECTRO | 220 | 20% | 25V |
| C223 | CE04LW1H101M | CAP. ELECTRO | 100 | 20% | 50V |
| C224 | CK45FB1H472K | CAP. CERAMIC | 4700P | 10% | 50V |
| C227 | CC45FCH2H101J | CAP. CERAMIC | 100P | 5% | 500V |
| C228 | CK45FB1H222K | CAP. CERAMIC | 2200P | 10% | 50V |
| C229 | C91-1317-05 | CAP. CERAMIC | 0.01 | 80/-20% | 2K |
| C230 | CK45E3D102P | CAP. CERAMIC | 1000P | | 2KV |
| C231 | C91-2581-05 | CAP. CERAMIC | 0.01 | 5% | 2KV |
| C232 | CE04EW2E010M | CAP. ELECTRO | 1 | 20% | 250V |
| C233 | CE04LW1C101M | CAP. ELECTRO | 100 | 20% | 16V |
| C234 | CE04LW1C101M | CAP. ELECTRO | 100 | 20% | 16V |
| C271 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C301 | CC45FCH1H101J | CAP. CERAMIC | 100P | 5% | 50V |
| C302 | CC45FSL1H331J | CAP. CERAMIC | 330P | 5% | 50V |
| C306 | C91-1361-05 | CAP. MYLAR | 0.01 | 10% | 100V |
| C307 | C91-2585-05 | CAP. MYLAR | 0.01 | 10% | 250V |
| C308 | C91-2587-05 | CAP. MYLAR | 0.1 | 10% | 250V |
| C309 | C91-1361-05 | CAP. MYLAR | 0.01 | 10% | 100V |
| C310 | C91-2587-05 | CAP. MYLAR | 0.1 | 10% | 250V |
| C311 | C91-2585-05 | CAP. MYLAR | 0.01 | 10% | 250V |
| C312 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C313 | NO USE | | | | |
| C314 | CK45FB2H152K | CAP. CERAMIC | 1500P | 10% | 500V |
| C315 | NO USE | | | | |
| C316 | CE04LW0J331M | CAP. ELECTRO | 330 | 20% | 6.3V |
| C317 | NO USE | | | | |
| C318 | CC45FCH1H020C | CAP. CERAMIC | 2P | 0.25P | 50V |
| C319 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C320 | NO USE | | | | |
| C321 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C322 | CE04LW1A221M | CAP. ELECTRO | 220 | 20% | 10V |
| C323 | CC45FCH1H150J | CAP. CERAMIC | 15P | 5% | 50V |
| C324 | CE04LW0J331M | CAP. ELECTRO | 330 | 20% | 6.3V |
| C325 | CE04LW1C101M | CAP. ELECTRO | 100 | 20% | 16V |
| C359 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C401 | CE04EW2E470M | CAP. ELECTRO | 47 | 20% | 250V |
| C402 | CE04EW2E100M | CAP. ELECTRO | 10 | 20% | 250V |
| C403 | CE04LW1E220M | CAP. ELECTRO | 22 | 20% | 25V |
| C404 | CE04EW2A471M | CAP. ELECTRO | 470 | 20% | 100V |
| C405 | CE04LW2A220M | CAP. ELECTRO | 22 | 20% | 100V |
| C406 | CE04EW1E472M | CAP. ELECTRO | 4700 | 20% | 25V |
| C407 | CE04LW1C331M | CAP. ELECTRO | 330 | 20% | 16V |
| C408 | CE04EW1E472M | CAP. ELECTRO | 4700 | 20% | 25V |
| C409 | CE04EW1A103M | CAP. ELECTRO | 1000 | 20% | 10V |
| C410 | CE04LW0J471M | CAP. ELECTRO | 470 | 20% | 6.3V |
| C411 | CE04LW1C331M | CAP. ELECTRO | 330 | 20% | 16V |
| C412 | CE04LW0J331M | CAP. ELECTRO | 330 | 20% | 6.3V |
| C413 | CE04LW1C101M | CAP. ELECTRO | 100 | 20% | 16V |
| C414 | CE04LW1C101M | CAP. ELECTRO | 100 | 20% | 16V |
| C415 | CE04EW1E102M | CAP. ELECTRO | 1000 | 20% | 25V |
| C416 | CE04EW1E102M | CAP. ELECTRO | 1000 | 20% | 25V |
| C417 | C91-0761-05 | CAP. CERAMIC | 2200P | 20% | 50V |
| C418 | C91-0757-05 | CAP. CERAMIC | 1000P | 10% | 50V |
| C501 | CK45FB1H152K | CAP. CERAMIC | 1500P | 10% | 50V |
| C504 | CE04HW1A470M | CAP. ELECTRO | 47 | 20% | 10V |
| C505 | CE04HW1A221M | CAP. ELECTRO | 220 | 20% | 10V |
| C801 | C91-1229-05 | CAP. CERAMIC | 3.3P | 10% | 50V |
| C802 | C91-1230-05 | CAP. CERAMIC | 3.9P | 10% | 50V |

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| C901 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C902 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| CN7 | E40-7519-05 | PIN CONNECTOR | 4P | | |
| CN20 | E40-3299-05 | PIN CONNECTOR | 2P | | |
| CN506 | E40-7515-05 | PIN CONNECTOR | 3P | | |
| CN507 | NO USE | | | | |
| CN508 | E40-7040-05 | PIN CONNECTOR | 13P | | |
| CN509 | NO USE | | | | |
| CN510 | E40-5069-05 | PIN CONNECTOR | 12P | | |
| CN515 | E40-7518-05 | PIN CONNECTOR | 6P | | |
| CN516 | E40-5067-05 | PIN CONNECTOR | 10P | | |
| CN517 | E40-3306-05 | PIN CONNECTOR | 9P | | |
| CN527 | E40-5069-05 | PIN CONNECTOR | 12P | | |
| CP1 | R90-0660-05 | RES. NETWORK | 4X1K | | |
| D1 | MA700 | DIODE | | | |
| D2 | MA700 | DIODE | | | |
| D3 | MA700 | DIODE | | | |
| D4 | MA700 | DIODE | | | |
| D5 | MA700 | DIODE | | | |
| D6 | 1SS132 | DIODE | | | |
| D7 | 1SS132 | DIODE | | | |
| D8 | 1SS132 | DIODE | | | |
| D9 | 1SS132 | DIODE | | | |
| D10 | 1SS132 | DIODE | | | |
| D11 | 1SS132 | DIODE | | | |
| D12 | MA700 | DIODE | | | |
| D13 | 1SS132 | DIODE | | | |
| D14 | 1SS132 | DIODE | | | |
| D15 | MA700 | DIODE | | | |
| D16 | 1SS132 | DIODE | | | |
| D17 | 1SS132 | DIODE | | | |
| D18 | 1SS132 | DIODE | | | |
| D19 | 1SS132 | DIODE | | | |
| D101 | 1SS132 | DIODE | | | |
| D102 | 1SS132 | DIODE | | | |
| D103 | 1SS132 | DIODE | | | |
| D104 | 1SS132 | DIODE | | | |
| D105 | 1SS132 | DIODE | | | |
| D106 | 1SS132 | DIODE | | | |
| D107 | 1SS132 | DIODE | | | |
| D108 | 1SS132 | DIODE | | | |
| D109 | MA700 | DIODE | | | |
| D110 | 1SS132 | DIODE | | | |
| D111 | 1SS132 | DIODE | | | |
| D112 | 1SS132 | DIODE | | | |
| D113 | 1SS132 | DIODE | | | |
| D114 | MA700 | DIODE | | | |
| D115 | 1SS132 | DIODE | | | |
| D116 | 1SS132 | DIODE | | | |
| D117 | 1SS132 | DIODE | | | |
| D118 | 1SS132 | DIODE | | | |
| D119 | 1SS132 | DIODE | | | |
| D120 | 1SS132 | DIODE | | | |
| D121 | 1SS132 | DIODE | | | |
| D122 | 1SS132 | DIODE | | | |
| D123 | 1SS132 | DIODE | | | |
| D124 | 1SS132 | DIODE | | | |
| D125 | 1SS132 | DIODE | | | |
| D126 | 1SS132 | DIODE | | | |
| D127 | 1SS132 | DIODE | | | |
| D128 | 1SS132 | DIODE | | | |
| D129 | 1SS132 | DIODE | | | |
| D130 | MA700 | DIODE | | | |
| D131 | 1SS132 | DIODE | | | |
| D132 | MA700 | DIODE | | | |
| D133 | MA700 | DIODE | | | |
| D150 | MA700 | DIODE | | | |
| D201 | 1SS132 | DIODE | | | |
| D202 | 1SS132 | DIODE | | | |
| D203 | 1SS83 | DIODE | | | |
| D204 | 1SS83 | DIODE | | | |
| D205 | 1SS83 | DIODE | | | |
| D206 | 1SS83 | DIODE | | | |
| D207 | 1SS83 | DIODE | | | |
| D208 | 1SS83 | DIODE | | | |
| D209 | 1SS83 | DIODE | | | |
| D210 | 1SS83 | DIODE | | | |
| D211 | 1SS132 | DIODE | | | |
| D212 | 1SS132 | DIODE | | | |
| D213 | 1SS132 | DIODE | | | |
| D220 | 1SS132 | DIODE | | | |
| D221 | 1SS132 | DIODE | | | |
| D301 | MA700 | DIODE | | | |
| D302 | 1SS132 | DIODE | | | |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| D303 | MTZ3.0JA | DIODE,ZENER | | | |
| D304 | 1SS132 | DIODE | | | |
| D305 | 1SS132 | DIODE | | | |
| D306 | MA700 | DIODE | | | |
| D307 | MA700 | DIODE | | | |
| D308 | TLR112 | LED,RED | | | |
| D309 | TLR112 | LED,RED | | | |
| D310 | 1SS132 | DIODE | | | |
| D311 | NO USE | | | | |
| D312 | MTZ5.1JB | DIODE,ZENER | | | |
| D313 | 1SS132 | DIODE | | | |
| D314 | NO USE | | | | |
| D315 | 1SS132 | DIODE | | | |
| D316 | MTZ3.0JA | DIODE,ZENER | | | |
| D401 | S1VB60 | DIODE,BRIDGE | | | |
| D402 | S1VB60 | DIODE,BRIDGE | | | |
| D403 | S4VB20F | DIODE,BRIDGE | | | |
| D404 | NO USE | | | | |
| D405 | 1SS132 | DIODE | | | |
| D406 | 1SS132 | DIODE | | | |
| D407 | MTZ13JC | DIODE,ZENER | | | |
| D408 | MTZ13JC | DIODE,ZENER | | | |
| D409 | MTZ7.5JA | DIODE,ZENER | | | |
| F201 | F53-0107-05 | THERMAL FUSE | | | |
| IC1 | TC4053BP | IC,TRIPLE 2-CH MPX/DE-MPX | | | |
| IC2 | NJM072BD | IC,JFET INPUT OP AMP | | | |
| IC3 | MC10102L | IC,QUAD 2-INPUT NOR GATE | | | |
| IC4 | KMS01 | IC,LINEAR | | | |
| IC101 | MC10131L | IC,DUAL D-FLIP FLOP | | | |
| IC102 | KMD05 | IC,LINEAR | | | |
| IC103 | SN74ALS74AN | IC,DUAL D-F.F. (WITH PR&CLR) | | | |
| IC104 | KMS01 | IC,LINEAR | | | |
| IC105 | KMD05 | IC,LINEAR | | | |
| IC106 | SN74ALS02N | IC,QUAD 2 INPUT NOR | | | |
| IC107 | KMS01 | IC,LINEAR | | | |
| IC108 | SN74ALS74AN | IC,DUAL D-F.F. (WITH PR&CLR) | | | |
| IC109 | TC74HC4053AP | IC,TRIPLE 2-CH ANALOG MPX | | | |
| IC201 | NJM4558D | IC,DUAL OP-AMP | | | |
| IC301 | TC74HC4053AP | IC,TRIPLE 2-CH ANALOG MPX | | | |
| IC302 | KMG01 | IC,LINEAR | | | |
| IC401 | KMA02 | IC,LINEAR | | | |
| K301 | S76-0627-05 | RELAY | | | |
| L101 | L79-0553-05 | NOISE FILTER | | | |
| L201 | L33-0842-05 | FERRI INDUCTOR | 150MH | | |
| L202 | L40-1011-50 | FERRI INDUCTOR | 100UH | | |
| L203 | L40-1011-50 | FERRI INDUCTOR | 100UH | | |
| L204 | L40-3925-51 | FERRI INDUCTOR | 3900UH | | |
| NL201 | NE-38B | NEON LAMP | | | |
| NL202 | NE-38B | NEON LAMP | | | |
| NL203 | NE-38B | NEON LAMP | | | |
| NL204 | NE-38B | NEON LAMP | | | |
| Q3 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q4 | 2SC1923(O) | TR. SI, NPN | | | |
| Q5 | 2SC1923(O) | TR. SI, NPN | | | |
| Q6 | 2SC3779(D) | TR. SI, NPN | | | |
| Q7 | 2SC3779(D) | TR. SI, NPN | | | |
| Q8 | NO USE | | | | |
| Q9 | 2SA1459(K) | TR. SI, PNP | | | |
| Q10 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q11 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q12 | 2SA1005(K) | TR. SI, PNP | | | |
| Q13 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q14 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q15 | 2SA1005(K) | TR. SI, PNP | | | |
| Q16 | 2SA1005(K) | TR. SI, PNP | | | |
| Q17 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q18 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q19 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q20 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q21 | 2SC1907 | TR. SI, NPN | | | |
| Q28 | 2SA1459(K) | TR. SI, PNP | | | |
| Q29 | NO USE | | | | |
| Q30 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q31 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q32 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q101 | 2SK170(V) | FET, N-CHANNEL | | | |
| Q102 | 2SC1923(O) | TR. SI, NPN | | | |
| Q103 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q104 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q105 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q106 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q107 | 2SK170(V) | FET, N-CHANNEL | | | |
| Q108 | 2SC1923(O) | TR. SI, NPN | | | |
| Q109 | 2SC3381(GR) | TR. SI, NPN | | | |
| Q110 | 2SA1459(K) | TR. SI, PNP | | | |
| Q111 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q112 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q113 | 2SA1005(K) | TR. SI, PNP | | | |
| Q114 | 2SA1005(K) | TR. SI, PNP | | | |
| Q115 | 2SA1005(K) | TR. SI, PNP | | | |
| Q116 | 2SA1005(K) | TR. SI, PNP | | | |
| Q117 | 2SC1923(O) | TR. SI, NPN | | | |
| Q118 | 2SC1923(O) | TR. SI, NPN | | | |
| Q119 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q120 | 2SA1459(K) | TR. SI, PNP | | | |
| Q121 | 2SC1923(O) | TR. SI, NPN | | | |
| Q122 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q123 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q124 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q125 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q126 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q127 | 2SA1005(K) | TR. SI, PNP | | | |
| Q130 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q151 | 2SA1459(K) | TR. SI, PNP | | | |
| Q152 | 2SA1459(K) | TR. SI, PNP | | | |
| Q158 | 2SA1459(K) | TR. SI, PNP | | | |
| Q162 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q201 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q202 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q203 | 2SC1923(O) | TR. SI, NPN | | | |
| Q204 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q205 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q206 | 2SC2910(S) | TR. SI, NPN | | | |
| Q207 | 2SA1208(S) | TR. SI, PNP | | | |
| Q208 | 2SC2910(S) | TR. SI, NPN | | | |
| Q209 | 2SA1208(S) | TR. SI, PNP | | | |
| Q210 | 2SC2551(O) | TR. SI, NPN | | | |
| Q211 | 2SC2551(O) | TR. SI, NPN | | | |
| Q212 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q213 | 2SD613(E) | TR. SI, NPN | | | |
| Q220 | 2SA1005(K) | TR. SI, PNP | | | |
| Q221 | 2SA1005(K) | TR. SI, PNP | | | |
| Q301 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q302 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q303 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q304 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q305 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q306 | 2SA1005(K) | TR. SI, PNP | | | |
| Q307 | 2SA1005(K) | TR. SI, PNP | | | |
| Q308 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q309 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q310 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q311 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q312 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q313 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q314 | 2SC1907 | TR. SI, NPN | | | |
| Q315 | 2SC1907 | TR. SI, NPN | | | |
| Q316 | 2SA1459(K) | TR. SI, PNP | | | |
| Q317 | 2SA1459(K) | TR. SI, PNP | | | |
| Q318 | 2SC1907 | TR. SI, NPN | | | |
| Q319 | 2SC1907 | TR. SI, NPN | | | |
| Q320 | 2SC4732(E) | TR. SI, NPN | | | |
| Q321 | 2SC4732(E) | TR. SI, NPN | | | |
| Q322 | 2SA1828(E) | TR. SI, PNP | | | |
| Q323 | 2SA1828(E) | TR. SI, PNP | | | |
| Q324 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q401 | 2SA1499(O,P) | TR. SI, PNP | | | |
| Q402 | 2SC2551(O) | TR. SI, NPN | | | |
| Q403 | 2SA1304 | TR. SI, PNP | | | |
| Q404 | 2SC2551(O) | TR. SI, NPN | | | |
| Q405 | 2SB1015(Y) | TR. SI, PNP | | | |
| Q406 | 2SD1406(Y) | TR. SI, NPN | | | |
| Q501 | 2SA933S(R,S) | TR. SI, PNP | | | |
| R1 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R2 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R3 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R4 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R5 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R6 | RD14BB2C822J | RES. CARBON | 8.2K | 5% | 1/6W |
| R7 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R8 | RD14BB2C181J | RES. CARBON | 180 | 5% | 1/6W |
| R9 | RD14BB2C105J | RES. CARBON | 1M | 5% | 1/6W |
| R10 | RD14BB2C105J | RES. CARBON | 1M | 5% | 1/6W |
| R11 | RD14BB2C105J | RES. CARBON | 1M | 5% | 1/6W |
| R12 | RD14BB2C105J | RES. CARBON | 1M | 5% | 1/6W |
| R13 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R14 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R15 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R16 | RD14BB2C751J | RES. CARBON | 750 | 5% | 1/6W |
| R17 | RD14BB2C821J | RES. CARBON | 820 | 5% | 1/6W |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R18 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R19 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R20 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R21 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R22 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R23 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R24 | RD14BB2C622J | RES. CARBON | 6.2K | 5% | 1/6W |
| R25 | RD14BB2C512J | RES. CARBON | 5.1K | 5% | 1/6W |
| R26 | RD14BB2C331J | RES. CARBON | 330 | 5% | 1/6W |
| R27 | RD14BB2C750J | RES. CARBON | 75 | 5% | 1/6W |
| R28 | RD14BB2C750J | RES. CARBON | 75 | 5% | 1/6W |
| R29 | RD14BB2C680J | RES. CARBON | 68 | 5% | 1/6W |
| R30 | RD14BB2C390J | RES. CARBON | 39 | 5% | 1/6W |
| R31 | RD14BB2C122J | RES. CARBON | 1.2K | 5% | 1/6W |
| R32 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R33 | RD14BB2C681J | RES. CARBON | 680 | 5% | 1/6W |
| R34 | NO USE | | | | |
| R35 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R36 | NO USE | | | | |
| R37 | RD14BB2C391J | RES. CARBON | 390 | 5% | 1/6W |
| R38 | RD14BB2C751J | RES. CARBON | 750 | 5% | 1/6W |
| R39 | NO USE | | | | |
| R40 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R41 | RD14BB2C683J | RES. CARBON | 68K | 5% | 1/6W |
| R42 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R43 | RD14BB2C393J | RES. CARBON | 39K | 5% | 1/6W |
| R44 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R45 | RD14BB2C163J | RES. CARBON | 16K | 5% | 1/6W |
| R46 | RD14BB2C752J | RES. CARBON | 7.5K | 5% | 1/6W |
| R47 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R48 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R49 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R50 | RD14BB2C393J | RES. CARBON | 39K | 5% | 1/6W |
| R51 | RD14BB2C123J | RES. CARBON | 12K | 5% | 1/6W |
| R52 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R53 | RD14BB2C113J | RES. CARBON | 11K | 5% | 1/6W |
| R54 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R55 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R56 | RD14BB2C182J | RES. CARBON | 1.8K | 5% | 1/6W |
| R57 | RD14BB2C272J | RES. CARBON | 2.7K | 5% | 1/6W |
| R58 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R59 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R60 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R61 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R62 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R63 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R64 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R65 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R66 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R67 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R68 | NO USE | | | | |
| R69 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R70 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R71 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R72 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R73 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R74 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R75 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R76 | NO USE | | | | |
| R77 | RD14BB2C752J | RES. CARBON | 7.5K | 5% | 1/6W |
| R78 | NO USE | | | | |
| R79 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R80 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R81 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R82 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R83 | RD14BB2E223J | RES. CARBON | 22K | 5% | 1/4W |
| R84 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R85 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R86 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R87 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R88 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R89 | NO USE | | | | |
| R90 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R91 | RD14BB2C203J | RES. CARBON | 20K | 5% | 1/6W |
| R92 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R93 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R94 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R95 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R96 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R101 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R102 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R103 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R104 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R105 | RD14BB2C332J | RES. CARBON | 3.3K | 5% | 1/6W |
| R106 | RD14BB2C332J | RES. CARBON | 3.3K | 5% | 1/6W |
| R107 | RD14BB2C912J | RES. CARBON | 9.1K | 5% | 1/6W |
| R108 | RD14BB2C163J | RES. CARBON | 16K | 5% | 1/6W |
| R109 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R110 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R111 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R112 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R113 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R114 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R115 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R116 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R117 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R118 | RD14BB2C162J | RES. CARBON | 1.6K | 5% | 1/6W |
| R119 | RD14BB2C243J | RES. CARBON | 24K | 5% | 1/6W |
| R120 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R121 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R122 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R123 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R124 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R125 | RD14BB2C330J | RES. CARBON | 33 | 5% | 1/6W |
| R126 | RD14BB2C120J | RES. CARBON | 12 | 5% | 1/6W |
| R127 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R128 | RD14BB2E471J | RES. CARBON | 470 | 5% | 1/4W |
| R129 | RD14BB2C332J | RES. CARBON | 3.3K | 5% | 1/6W |
| R130 | RD14BB2C332J | RES. CARBON | 3.3K | 5% | 1/6W |
| R131 | RD14BB2C912J | RES. CARBON | 9.1K | 5% | 1/6W |
| R132 | RD14BB2C163J | RES. CARBON | 16K | 5% | 1/6W |
| R133 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R134 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R135 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R136 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R137 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R138 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R139 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R140 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R141 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R142 | NO USE | | | | |
| R143 | RD14BB2C302J | RES. CARBON | 3K | 5% | 1/6W |
| R144 | RD14BB2C302J | RES. CARBON | 3K | 5% | 1/6W |
| R145 | RD14BB2C131J | RES. CARBON | 130 | 5% | 1/6W |
| R146 | RD14BB2C682J | RES. CARBON | 6.8K | 5% | 1/6W |
| R147 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R148 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R149 | RD14BB2C183J | RES. CARBON | 18K | 5% | 1/6W |
| R150 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R151 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R152 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R153 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R154 | RD14BB2C684J | RES. CARBON | 680K | 5% | 1/6W |
| R155 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R156 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R157 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R158 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R159 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R160 | RD14BB2C202J | RES. CARBON | 2K | 5% | 1/6W |
| R161 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R162 | RD14BB2C202J | RES. CARBON | 2K | 5% | 1/6W |
| R163 | RD14BB2C151J | RES. CARBON | 150 | 5% | 1/6W |
| R164 | RD14BB2C111J | RES. CARBON | 110 | 5% | 1/6W |
| R165 | RD14BB2C681J | RES. CARBON | 680 | 5% | 1/6W |
| R166 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R167 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R168 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R169 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R170 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R171 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R172 | RD14BB2C751J | RES. CARBON | 750 | 5% | 1/6W |
| R173 | RD14BB2C431J | RES. CARBON | 430 | 5% | 1/6W |
| R174 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R175 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R176 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R177 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R178 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R179 | RD14BB2C121J | RES. CARBON | 120 | 5% | 1/6W |
| R180 | NO USE | | | | |
| R181 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R182 | RD14BB2C822J | RES. CARBON | 8.2K | 5% | 1/6W |
| R183 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R184 | RD14BB2C621J | RES. CARBON | 620 | 5% | 1/6W |
| R185 | RD14BB2E103J | RES. CARBON | 10K | 5% | 1/4W |
| R186 | RD14BB2C202J | RES. CARBON | 2K | 5% | 1/6W |
| R187 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R188 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R189 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R190 | RD14BB2C682J | RES. CARBON | 6.8K | 5% | 1/6W |
| R191 | RD14BB2C682J | RES. CARBON | 6.8K | 5% | 1/6W |
| R192 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R193 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R194 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R195 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R196 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R197 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R198 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R199 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R202 | RD14BB2C113J | RES. CARBON | 11K | 5% | 1/6W |
| R203 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R204 | RD14BB2C272J | RES. CARBON | 2.7K | 5% | 1/6W |
| R205 | NO USE | | | | |
| R206 | RD14BB2C432J | RES. CARBON | 4.3K | 5% | 1/6W |
| R207 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R208 | RD14BB2C512J | RES. CARBON | 5.1K | 5% | 1/6W |
| R209 | RD14BB2C202J | RES. CARBON | 2K | 5% | 1/6W |
| R210 | RD14BB2C333J | RES. CARBON | 33K | 5% | 1/6W |
| R214 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R215 | RD14BB2C431J | RES. CARBON | 430 | 5% | 1/6W |
| R216 | RD14BB2C332J | RES. CARBON | 3.3K | 5% | 1/6W |
| R217 | NO USE | | | | |
| R218 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R219 | RD14BB2C134J | RES. CARBON | 130K | 5% | 1/6W |
| R220 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R221 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R222 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R223 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R224 | RD14BB2C562J | RES. CARBON | 5.6K | 5% | 1/6W |
| R225 | RD14BB2C134J | RES. CARBON | 130K | 5% | 1/6W |
| R226 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R227 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R228 | RD14BB2C753J | RES. CARBON | 75K | 5% | 1/6W |
| R229 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R230 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R231 | RD14BB2C562J | RES. CARBON | 5.6K | 5% | 1/6W |
| R232 | RD14BB2C134J | RES. CARBON | 130K | 5% | 1/6W |
| R233 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R234 | RD14BB2C474J | RES. CARBON | 470K | 5% | 1/6W |
| R235 | RD14BB2C474J | RES. CARBON | 470K | 5% | 1/6W |
| R236 | R92-1563-05 | RES. METAL FILM | 10M | 5% | 1/4W |
| R237 | R92-1563-05 | RES. METAL FILM | 10M | 5% | 1/4W |
| R238 | R92-1562-05 | RES. METAL FILM | 8.2M | 5% | 1/4W |
| R239 | R92-1561-05 | RES. METAL FILM | 3.9M | 5% | 1/4W |
| R240 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R241 | RD14BB2C474J | RES. CARBON | 470K | 5% | 1/6W |
| R242 | RD14BB2C683J | RES. CARBON | 68K | 5% | 1/6W |
| R243 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R244 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R245 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R246 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R247 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R248 | RN14BK2C1203F | RES. METAL FILM | 120K | 1% | 1/6W |
| R249 | R92-1564-05 | RES. METAL FILM | 15M | 1% | 1/2W |
| R250 | RD14BB2C124J | RES. CARBON | 120K | 5% | 1/6W |
| R251 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R252 | RD14BB2C392J | RES. CARBON | 3.9K | 5% | 1/6W |
| R253 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R254 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R255 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R256 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R257 | RD14BB2C151J | RES. CARBON | 150 | 5% | 1/6W |
| R258 | RD14BB2C302J | RES. CARBON | 3K | 5% | 1/6W |
| R259 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R260 | RN14BK2C1801F | RES. METAL FILM | 1.8K | 1% | 1/6W |
| R261 | RN14BK2C1801F | RES. METAL FILM | 1.8K | 1% | 1/6W |
| R262 | RD14BB2C362J | RES. CARBON | 3.6K | 5% | 1/6W |
| R263 | RD14BB2C562J | RES. CARBON | 5.6K | 5% | 1/6W |
| R264 | RD14BB2C303J | RES. CARBON | 30K | 5% | 1/6W |
| R265 | RD14BB2C562J | RES. CARBON | 5.6K | 5% | 1/6W |
| R266 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R267 | RD14BB2C224J | RES. CARBON | 220K | 5% | 1/6W |
| R268 | RD14BB2C433J | RES. CARBON | 43K | 5% | 1/6W |
| R269 | R92-1573-05 | RES. LINEAR PCT | 2.7K | | |
| R270 | RD14BB2C681J | RES. CARBON | 680 | 5% | 1/6W |
| R271 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R272 | RD14BB2C151J | RES. CARBON | 150 | 5% | 1/6W |
| R273 | RD14BB2C202J | RES. CARBON | 2K | 5% | 1/6W |
| R274 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R275 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R280 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R281 | RD14BB2C622J | RES. CARBON | 6.2K | 5% | 1/6W |
| R282 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R283 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R300 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R301 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R302 | RD14BB2C821J | RES. CARBON | 820 | 5% | 1/6W |
| R303 | RD14BB2C821J | RES. CARBON | 820 | 5% | 1/6W |
| R304 | RD14BB2C122J | RES. CARBON | 1.2K | 5% | 1/6W |
| R305 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R306 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R307 | RD14BB2C202J | RES. CARBON | 2K | 5% | 1/6W |
| R308 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R309 | RD14BB2C242J | RES. CARBON | 2.4K | 5% | 1/6W |
| R310 | RD14BB2C242J | RES. CARBON | 2.4K | 5% | 1/6W |
| R311 | RD14BB2C362J | RES. CARBON | 3.6K | 5% | 1/6W |
| R312 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R313 | RD14BB2C182J | RES. CARBON | 1.8K | 5% | 1/6W |
| R314 | RD14BB2C432J | RES. CARBON | 4.3K | 5% | 1/6W |
| R315 | RD14BB2C132J | RES. CARBON | 1.3K | 5% | 1/6W |
| R316 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R317 | RD14BB2C682J | RES. CARBON | 6.8K | 5% | 1/6W |
| R318 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R319 | RD14BB2C202J | RES. CARBON | 2K | 5% | 1/6W |
| R320 | RD14BB2C682J | RES. CARBON | 6.8K | 5% | 1/6W |
| R321 | RD14BB2C183J | RES. CARBON | 18K | 5% | 1/6W |
| R322 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R323 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R324 | RD14BB2C242J | RES. CARBON | 2.4K | 5% | 1/6W |
| R325 | RD14BB2C912J | RES. CARBON | 9.1K | 5% | 1/6W |
| R326 | RD14BB2C301J | RES. CARBON | 300 | 5% | 1/6W |
| R327 | RD14BB2C391J | RES. CARBON | 390 | 5% | 1/6W |
| R328 | RD14BB2C391J | RES. CARBON | 390 | 5% | 1/6W |
| R329 | RD14BB2C390J | RES. CARBON | 39 | 5% | 1/6W |
| R330 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R331 | RD14BB2C271J | RES. CARBON | 270 | 5% | 1/6W |
| R332 | RD14BB2C132J | RES. CARBON | 1.3K | 5% | 1/6W |
| R333 | RD14BB2C432J | RES. CARBON | 4.3K | 5% | 1/6W |
| R334 | RD14BB2C432J | RES. CARBON | 4.3K | 5% | 1/6W |
| R335 | RD14BB2C243J | RES. CARBON | 24K | 5% | 1/6W |
| R336 | RD14BB2C243J | RES. CARBON | 24K | 5% | 1/6W |
| R337 | RD14BB2C241J | RES. CARBON | 240 | 5% | 1/6W |
| R338 | RD14BB2C241J | RES. CARBON | 240 | 5% | 1/6W |
| R339 | NO USE | | | | |
| R340 | RN14BK2C8200F | RES. METAL FILM | 820 | 1% | 1/6W |
| R341 | RN14BK2C8200F | RES. METAL FILM | 820 | 1% | 1/6W |
| R342 | RD14BB2C912J | RES. CARBON | 9.1K | 5% | 1/6W |
| R343 | RD14BB2C332J | RES. CARBON | 3.3K | 5% | 1/6W |
| R344 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R345 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R346 | RD14BB2C561J | RES. CARBON | 560 | 5% | 1/6W |
| R347 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R348 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R349 | R92-1552-05 | RES. LINEAR PCT | 180 | | |
| R350 | RD14BB2C163J | RES. CARBON | 16K | 5% | 1/6W |
| R351 | NO USE | | | | |
| R352 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R353 | RD14BB2C202J | RES. CARBON | 2K | 5% | 1/6W |
| R354 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R355 | RD14BB2C391J | RES. CARBON | 390 | 5% | 1/6W |
| R356 | NO USE | | | | |
| R357 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R358 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R359 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R360 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R361 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R362 | RD14BB2C122J | RES. CARBON | 1.2K | 5% | 1/6W |
| R363 | RD14BB2C122J | RES. CARBON | 1.2K | 5% | 1/6W |
| R364 | RN14BK2C3901F | RES. METAL FILM | 3.9K | 1% | 1/6W |
| R365 | RN14BK2C6201F | RES. METAL FILM | 6.2K | 1% | 1/6W |
| R366 | R92-1560-05 | RES. LINEAR PCT | 2K | | |
| R367 | RD14BB2C393J | RES. CARBON | 39K | 5% | 1/6W |
| R368 | RD14BB2C622J | RES. CARBON | 6.2K | 5% | 1/6W |
| R369 | RD14BB2C394J | RES. CARBON | 390K | 5% | 1/6W |
| R370 | R92-1199-05 | RES. LINEAR PCT | 3K | | |
| R371 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R372 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R373 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R374 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R375 | RD14BB2C362J | RES. CARBON | 3.6K | 5% | 1/6W |
| R376 | RD14BB2C362J | RES. CARBON | 3.6K | 5% | 1/6W |
| R377 | R92-1558-05 | RES. METAL FILM | 39K | 5% | 1W |
| R378 | R92-1558-05 | RES. METAL FILM | 39K | 5% | 1W |
| R381 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R382 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R383 | RD14BB2C751J | RES. CARBON | 750 | 5% | 1/6W |
| R384 | RD14BB2C751J | RES. CARBON | 750 | 5% | 1/6W |
| R385 | RN14BK2C6801F | RES. METAL FILM | 6.8K | 1% | 1/6W |
| R386 | RN14BK2C1303F | RES. METAL FILM | 130K | 1% | 1/6W |
| R387 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R388 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R389 | NO USE | | | | |
| R390 | RD14BB2C913J | RES. CARBON | 91K | 5% | 1/6W |
| R391 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R392 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R393 | NO USE | | | | |
| R394 | R92-1559-05 | RES. METAL FILM | 47K | 5% | 1W |
| R395 | R92-1559-05 | RES. METAL FILM | 47K | 5% | 1W |
| R396 | RD14BB2C431J | RES. CARBON | 430 | 5% | 1/6W |
| R397 | RN14BK2C1501F | RES. METAL FILM | 1.5K | 1% | 1/6W |
| R398 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R399 | RD14BB2C470J | RES. CARBON | 47 | 5% | 1/6W |
| R400 | NO USE | | | | |
| R401 | R92-1557-05 | RES. METAL FILM | 6.8K | 5% | 2W |
| R402 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R403 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R404 | R92-1556-05 | RES. METAL FILM | 1K | 5% | 2W |
| R405 | R92-1556-05 | RES. METAL FILM | 1K | 5% | 2W |
| R406 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R407 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R408 | R92-1555-05 | RES. METAL FILM | 56 | 5% | 2W |
| R409 | R92-1555-05 | RES. METAL FILM | 56 | 5% | 2W |
| R410 | R92-1555-05 | RES. METAL FILM | 56 | 5% | 2W |
| R411 | R92-1555-05 | RES. METAL FILM | 56 | 5% | 2W |
| R412 | R92-1555-05 | RES. METAL FILM | 56 | 5% | 2W |
| R413 | R92-1555-05 | RES. METAL FILM | 56 | 5% | 2W |
| R414 | NO USE | | | | |
| R415 | RD14BB2C472J | RES. CARBON | 4.7K | 5% | 1/6W |
| R416 | RD14BB2C302J | RES. CARBON | 3K | 5% | 1/6W |
| R417 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R501 | RN14BK2C1501F | RES. METAL FILM | 1.5K | 1% | 1/6W |
| R502 | RN14BK2C4701F | RES. METAL FILM | 4.7K | 1% | 1/6W |
| R503 | RD14BB2C821J | RES. CARBON | 820 | 5% | 1/6W |
| R504 | RD14BB2C563J | RES. CARBON | 56K | 5% | 1/6W |
| R505 | RD14BB2C753J | RES. CARBON | 75K | 5% | 1/6W |
| TC101 | C05-0470-05 | CAP. TRIMMER | 20P | | |
| TC102 | C05-0470-05 | CAP. TRIMMER | 20P | | |
| TC303 | C05-0490-05 | CAP. TRIMMER | 20P | | |
| TH301 | 112-103-2FM | THERMISTOR | | | |
| VR1 | R12-3597-05 | RES. SEMI FIXED | 47K | | |
| VR2 | R12-0680-05 | RES. SEMI FIXED | 47K | | |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| VR102 | R12-0694-05 | RES. SEMI FIXED 4.7KB |
| VR103 | R12-0680-05 | RES. SEMI FIXED 47K |
| VR104 | R12-1860-05 | RES. SEMI FIXED 1KB |
| VR201 | R12-5545-05 | RES. SEMI FIXED 2.2MB |
| VR202 | R12-5565-05 | RES. SEMI FIXED 100KB |
| VR301 | R12-0680-05 | RES. SEMI FIXED 47K |
| VR302 | R12-0882-05 | RES. SEMI FIXED 100 B |
| VR303 | R12-0678-05 | RES. SEMI FIXED 10KB |
| VR304 | R12-0694-05 | RES. SEMI FIXED 4.7KB |
| VR305 | R12-6501-05 | RES. SEMI FIXED 470KB |
| VR306 | R12-3042-05 | RES. SEMI FIXED 47KB |
| VR307 | R12-0680-05 | RES. SEMI FIXED 47K |
| VR308 | R12-0890-05 | RES. SEMI FIXED 470 B |
| VR309 | R12-0883-05 | RES. SEMI FIXED 220 B |
| W1 | E38-1005-05 | WIRE ASS'Y;3P |
| W2 | E38-1177-05 | WIRE ASS'Y |
| W3 | E38-1259-05 | WIRE ASS'Y;1P |
| W14 | E38-1317-05 | WIRE ASS'Y;9P |
| W18 | E38-0990-05 | WIRE ASS'Y;6P |
| W19 | E38-1176-05 | WIRE ASS'Y;2P |
| W509 | E38-1256-05 | WIRE ASS'Y;7P |
| W510 | NO USE | |
| W511 | E38-1206-05 | WIRE ASS'Y;6P |
| W528 | E38-1172-05 | WIRE ASS'Y;7P |

## DCS-7020 DSP UNIT

### X79-1300-00

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | F15-0744-05 | BLIND PLATE | | | |
| | J73-0394-02 | PCB (UNMOUNTED) | | | |
| BA1 | W09-2381-05 | BATTERY | | | |
| C1 | CC45FCH1H680J | CAP. CERAMIC | 68P | 5% | 50V |
| C2 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C3 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C4 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C5 | CK45B1H102KTA | CAP. CERAMIC | 1000P | 10% | 50V |
| C6 | CK45B1H102KTA | CAP. CERAMIC | 1000P | 10% | 50V |
| C7 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C8 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C9 | CC45FCH1H040C | CAP. CERAMIC | 4P | 0.25P | 50V |
| C10 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C11 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C12 | CK45FB1H102K | CAP. CERAMIC | 1000P | 10% | 50V |
| C13 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C14 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C15 | CK45FB1H102K | CAP. CERAMIC | 1000P | 10% | 50V |
| C16 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C17 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C18 | CC45CH1H220JTA | CAP. CERAMIC | 22P | 5% | 50V |
| C19 | CC45CH1H220JTA | CAP. CERAMIC | 22P | 5% | 50V |
| C20 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C21 | CC45FSL1H471J | CAP. CERAMIC | 470P | 5% | 50V |
| C22 | NO USE | | | | |
| C23 | CE04LW1A221M | CAP. ELECTRO | 220 | 20% | 10V |
| C24 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C25 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C26 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C27 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C28 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C29 | CE04LW1A221M | CAP. ELECTRO | 220 | 20% | 10V |
| C30 | CE04LW1C221M | CAP. ELECTRO | 220 | 20% | 16V |
| C31 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C32 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C33 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C34 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C35 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C36 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C37 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C38 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C39 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C40 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C41 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C42 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C43 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C44 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C45 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C46 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C47 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C48 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C49 | CK45B1H102KTA | CAP. CERAMIC | 1000P | 10% | 50V |
| C50 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C77 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C78 | CC45FCH1H181J | CAP. CERAMIC | 180P | 5% | 50V |
| C79 | NO USE | | | | |
| C80 | CC45FSL1H391J | CAP. CERAMIC | 390P | 5% | 50V |
| C81 | CC45FCH1H271J | CAP. CERAMIC | 270P | 5% | 50V |
| C82 | CC45FCH1H220J | CAP. CERAMIC | 22P | 5% | 50V |
| C83 | NO USE | | | | |
| C84 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C85 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C86 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C87 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C88 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C89 | CC45FSL1H471J | CAP. CERAMIC | 470P | 5% | 50V |
| C101 | CC45FCH1H151J | CAP. CERAMIC | 150P | 5% | 50V |
| C102 | NO USE | | | | |
| C103 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C104 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C105 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C106 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C107 | NO USE | | | | |
| C108 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C109 | CE04LW1C221M | CAP. ELECTRO | 220 | 20% | 16V |
| C110 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C111 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C112 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C115 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C124 | CC45FCH1H101J | CAP. CERAMIC | 100P | 5% | 50V |
| C125 | CC45FCH1H150J | CAP. CERAMIC | 15P | 5% | 50V |
| C126 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C127 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C128 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C201 | CC45FCH1H151J | CAP. CERAMIC | 150P | 5% | 50V |
| C202 | NO USE | | | | |
| C203 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C204 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C205 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C206 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C207 | NO USE | | | | |
| C208 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C209 | CE04LW1C221M | CAP. ELECTRO | 220 | 20% | 16V |
| C210 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C211 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C212 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C215 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C224 | CC45FCH1H101J | CAP. CERAMIC | 100P | 5% | 50V |
| C225 | CC45FCH1H150J | CAP. CERAMIC | 15P | 5% | 50V |
| C226 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C227 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C228 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C301 | CC45FCH1H220J | CAP. CERAMIC | 22P | 5% | 50V |
| C302 | CC45FCH1H050C | CAP. CERAMIC | 5P | 0.25P | 50V |
| C303 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C304 | CC45FCH1H050C | CAP. CERAMIC | 5P | 0.25P | 50V |
| C305 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C306 | CC45FCH1H050C | CAP. CERAMIC | 5P | 0.25P | 50V |
| C307 | CE04LW1A471M | CAP. ELECTRO | 470 | 20% | 10V |
| C801 | CF92V1H102J | CAP. POLYESTER | 1000P | 5% | 50V |
| CN502 | E40-7515-05 | PIN CONNECTOR | 3P | | |
| CN523 | E40-7532-05 | PIN CONNECTOR | 23P | | |
| CN524 | E40-7520-05 | PIN CONNECTOR | 30P | | |
| CN525 | E40-3243-05 | PIN CONNECTOR | 8P | | |
| CN526 | NO USE | | | | |
| CN527 | E40-5069-05 | PIN CONNECTOR | 12P | | |
| CN528 | E40-3242-05 | PIN CONNECTOR | 7P | | |
| CN531 | E40-7519-05 | PIN CONNECTOR | 4P | | |
| CN532 | E40-7519-05 | PIN CONNECTOR | 4P | | |
| D1 | MA700 | DIODE | | | |
| D2 | MA700 | DIODE | | | |
| D3 | 1SS132 | DIODE | | | |
| D4 | 1SS132 | DIODE | | | |
| D39 | 1SS132 | DIODE | | | |
| D100 | MA700 | DIODE | | | |
| D200 | MA700 | DIODE | | | |
| D301 | MA700 | DIODE | | | |
| IC1 | PST7045 | IC,RESET | | | |
| IC2 | MB88101APFV-GB | IC,4-CH 12-BIT A/D CONVERTER | | | |
| IC3 | NO USE | | | | |
| IC4 | HD14066BFP | IC,QUAD BILATERAL SWITCH | | | |
| IC5 | T93-0893-05 | PROGRAM ROM | | | |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| IC6 | T93-0894-05 | PROGRAM ROM | | | |
| IC7 | HD74LS32FP | IC,QUAD 2-INPUT OR GATE | | | |
| IC8 | HD74LS32FP | IC,QUAD 2-INPUT OR GATE | | | |
| IC9 | HD74LS74FP | IC,DUAL D-F.F. (WITH PR&CLR) | | | |
| IC10 | HD74LS244FP | IC,OCTAL 3-STATE BUS BUFFER | | | |
| IC11 | HD74HC86FP | IC,QUAD EXCLUSIVE OR GATE | | | |
| IC12 | HD74HC08FP | IC,QUAD 2-INPUT AND GATE | | | |
| IC13 | HD74LS138FP | IC,3-TO-8 DEMULTIPLEXER | | | |
| IC14 | HD74LS138FP | IC,3-TO-8 DEMULTIPLEXER | | | |
| IC15 | HD74LS244FP | IC,OCTAL 3-STATE BUS BUFFER | | | |
| IC16 | HD74LS138FP | IC,3-TO-8 DEMULTIPLEXER | | | |
| IC17 | CTM5290 | IC,GATE ARRAY | | | |
| IC18 | HD64610FP | IC,CALENDER CLOCK | | | |
| IC19 | 62256BLFP7SL | IC,SRAM 256K | | | |
| IC20 | HD74LS157FP | IC,2 TO 1 DATA SELECT./MPX | | | |
| IC21 | HD74LS157FP | IC,2 TO 1 DATA SELECT./MPX | | | |
| IC22 | HD74LS157FP | IC,2 TO 1 DATA SELECT./MPX | | | |
| IC23 | HD74LS157FP | IC,2 TO 1 DATA SELECT./MPX | | | |
| IC24 | 622568LFP7SL | IC,SRAM 256K | | | |
| IC25 | 62256BLFP7SL | IC,SRAM 256K | | | |
| IC26 | HD6433040A00F | IC,16-BIT MICROCESSOR | | | |
| IC27 | HD74HC245FP | IC,OCTAL BUS TRANSCEIVERS | | | |
| IC28 | HD74LS244FP | IC,OCTAL 3-STATE BUS BUFFER | | | |
| IC29 | HD74HC244FP | IC,OCTAL BUS BUFFER | | | |
| IC30 | HD74LS244FP | IC,OCTAL 3-STATE BUS BUFFER | | | |
| IC31 | HD74LS374FP | IC,OCTAL 3-STATE D-FF | | | |
| IC32 | DAC0808LCM | IC,8-BIT D/A CONVERTER | | | |
| IC33 | HA17012PB | IC,12-BIT D/A CONVERTER | | | |
| IC34 | HA17012PB | IC,12-BIT D/A CONVERTER | | | |
| IC35 | UPC814C | IC,JFET INPUT OP-AMP | | | |
| IC36 | NJM072BD | IC,JFET INPUT OP AMP | | | |
| IC37 | SN74AS74NS | IC,DUAL D-F.F. (WITH PR & CLR) | | | |
| IC38 | SN74AS151NS | IC,8 TO 1 DATA SELECTOR/MPX | | | |
| IC39 | HD74HC123FP | IC,DUAL MONOSTABLE MULTIB. | | | |
| IC40 | SN74AS153NS | IC,4 TO 1 DATA SELECTOR/MPX | | | |
| IC41 | MB86001PF-GBND | IC,PLL FREOUENCY SYNTHESIZER | | | |
| IC42 | SN74F161ANS | IC,SYNC. 4-BIT BINARY COUNTER | | | |
| IC43 | SN74AS00NS | IC,2-INPUT NAND GATE | | | |
| IC44 | SN74AS74NS | IC,DUAL D-F.F. (WITH PR & CLR) | | | |
| IC45 | CTM5300 | IC,GATE ARRAY | | | |
| IC46 | HD74LS374FP | IC,OCTAL 3-STATE D-FF | | | |
| IC47 | HD74LS138FP | IC,3-TO-8 DEMULTIPLEXER | | | |
| | | | | | |
| IC100 | AN8122FAP | IC,8-BIT A/D CONVERTER | | | |
| IC101 | NO USE | | | | |
| IC102 | DTM6010 | IC,GATE ARRAY | | | |
| IC103 | HM63021FP-34 | IC,CMOS STATIC RAM | | | |
| IC104 | HM63021FP-34 | IC,CMOS STATIC RAM | | | |
| | | | | | |
| IC200 | AN8122FAP | IC,8-BIT A/D CONVERTER | | | |
| IC201 | NO USE | | | | |
| IC202 | DTM6010 | IC,GATE ARRAY | | | |
| IC203 | HM63021FP-34 | IC,CMOS STATIC RAM | | | |
| IC204 | HM63021FP-34 | IC,CMOS STATIC RAM | | | |
| | | | | | |
| L3 | L79-0553-05 | FILTER | | | |
| L4 | L79-0553-05 | FILTER | | | |
| L5 | L40-2281-17 | FERRI INDUCTOR 0.22UH | | | |
| L6 | NO USE | | | | |
| L7 | L79-0553-05 | FILTER | | | |
| | | | | | |
| L301 | L40-2281-17 | FERRI INDUCTOR 0.22UH | | | |
| L302 | L79-0553-05 | FILTER | | | |
| L303 | L79-0553-05 | FILTER | | | |
| | | | | | |
| Q1 | 2SC4049 | TR. SI, NPN | | | |
| Q2 | 2SA933S(R,S) | TR. SI, PNP | | | |
| | | | | | |
| Q101 | 2SC1923(O) | TR. SI, NPN | | | |
| Q102 | 2SC1923(O) | TR. SI, NPN | | | |
| Q103 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| | | | | | |
| Q201 | 2SC1923(O) | TR. SI, NPN | | | |
| Q202 | 2SC1923(O) | TR. SI, NPN | | | |
| Q203 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| | | | | | |
| Q301 | 2SC3354(S) | TR. SI, NPN | | | |
| Q302 | 2SC3354(S) | TR. SI, NPN | | | |
| | | | | | |
| R1 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R2 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R3 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R4 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R5 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R6 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R7 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R8 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R9 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R10 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R11 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R12 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R13 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R14 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R15 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R16 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R17 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R18 | RN14BK2C1001F | RES. METAL FILM | 1K | 1% | 1/6W |
| R19 | RN14BK2C1202F | RES. METAL FILM | 12K | 1% | 1/6W |
| R20 | RN14BK2C1202F | RES. METAL FILM | 12K | 1% | 1/6W |
| R21 | RN14BK2C1201F | RES. METAL FILM | 1.2K | 1% | 1/6W |
| R22 | RN14BK2C2001F | RES. METAL FILM | 2K | 1% | 1/6W |
| R23 | RN14BK2C1202F | RES. METAL FILM | 12K | 1% | 1/6W |
| R24 | RN14BK2C1202F | RES. METAL FILM | 12K | 1% | 1/6W |
| R25 | RD14BB2C330J | RES. CARBON | 33 | 5% | 1/6W |
| R26 | RN14BK2C1201F | RES. METAL FILM | 1.2K | 1% | 1/6W |
| R27 | RD14BB2C330J | RES. CARBON | 33 | 5% | 1/6W |
| R28 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R29 | RN14BK2C1001F | RES. METAL FILM | 1K | 1% | 1/6W |
| R30 | RN14BK2C1501F | RES. METAL FILM | 1.5K | 1% | 1/6W |
| R31 | RN14BK2C3001F | RES. METAL FILM | 3K | 1% | 1/6W |
| R32 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R33 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R34 | RD14BB2C134J | RES. CARBON | 130K | 5% | 1/6W |
| R35 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R36 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R37 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R38 | RD14BB2C303J | RES. CARBON | 30K | 5% | 1/6W |
| R39 | RD14BB2C474J | RES. CARBON | 470K | 5% | 1/6W |
| R40 | RD14BB2C752J | RES. CARBON | 7.5K | 5% | 1/6W |
| R41 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R42 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R43 | RD14BB2C681J | RES. CARBON | 680 | 5% | 1/6W |
| R44 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R45 | NO USE | | | | |
| R46 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R47 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R48 | NO USE | | | | |
| R49 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R50 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R51 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R52 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R53 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R54 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R55 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R56 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R57 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R58 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R59 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R60 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R61 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R62 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R63 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R64 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R65 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R66 | RD14BB2C512J | RES. CARBON | 5.1K | 5% | 1/6W |
| R67 | RD14BB2C512J | RES. CARBON | 5.1K | 5% | 1/6W |
| R68 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| | | | | | |
| R73 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R74 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R75 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R76 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R77 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R78 | RD14BB2C273J | RES. CARBON | 27K | 5% | 1/6W |
| R79 | RD14BB2C390J | RES. CARBON | 39 | 5% | 1/6W |
| | | | | | |
| R100 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| | | | | | |
| R103 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R104 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R105 | RN14BK2C3901F | RES. METAL FILM | 3.9K | 1% | 1/6W |
| R106 | RN14BK2C3901F | RES. METAL FILM | 3.9K | 1% | 1/6W |
| R107 | RN14BK2C1601F | RES. METAL FILM | 1.6K | 1% | 1/6W |
| R108 | RN14BK2C1601F | RES. METAL FILM | 1.6K | 1% | 1/6W |
| R109 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R110 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R111 | RD14BB2C271J | RES. CARBON | 270 | 5% | 1/6W |
| R112 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R113 | NO USE | | | | |
| R114 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R115 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R116 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| | | | | | |
| R119 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R120 | RD14BB2C510J | RES. CARBON | 51 | 5% | 1/6W |
| | | | | | |
| R203 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R204 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R205 | RN14BK2C3901F | RES. METAL FILM | 3.9K | 1% | 1/6W |
| R206 | RN14BK2C3901F | RES. METAL FILM | 3.9K | 1% | 1/6W |
| R207 | RN14BK2C1601F | RES. METAL FILM | 1.6K | 1% | 1/6W |
| R208 | RN14BK2C1601F | RES. METAL FILM | 1.6K | 1% | 1/6W |
| R209 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R210 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R211 | RD14BB2C271J | RES. CARBON | 270 | 5% | 1/6W |
| R212 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R213 | NO USE | | | | |
| R214 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R215 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R216 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| | | | | | |
| R219 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R220 | RD14BB2C510J | RES. CARBON | 51 | 5% | 1/6W |
| | | | | | |
| R301 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R302 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R303 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R304 | NO USE | | | | |
| R305 | RN14BK2C3602F | RES. METAL FILM | 36K | 1% | 1/6W |
| R306 | RN14BK2C7501F | RES. METAL FILM | 7.5K | 1% | 1/6W |
| R307 | RD14BB2C302J | RES. CARBON | 3K | 5% | 1/6W |
| R801 | R92-0150-05 | JUMPING RES. | ZERO OHM(10MM) | | |
| R802 | R92-0150-05 | JUMPING RES. | ZERO OHM(10MM) | | |
| VR101 | R12-0889-05 | RES. SEMI FIXED | 220 B | | |
| VR102 | R12-0889-05 | RES. SEMI FIXED | 220 B | | |
| VR201 | R12-0889-05 | RES. SEMI FIXED | 220 B | | |
| VR202 | R12-0889-05 | RES. SEMI FIXED | 220 B | | |
| X1 | L77-2505-05 | CRYSTAL RESONATOR | | | |
| X2 | L77-1229-05 | CRYSTAL RESONATOR | | | |
| X3 | L78-0134-05 | CERAMIC RESONATOR | | | |

## DCS-7040 DSP UNIT

## X79-1300-01

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | F15-0744-05 | BLIND PLATE | | | |
| | J73-0394-02 | PCB (UNMOUNTED) | | | |
| BA1 | W09-2381-05 | BATTERY | | | |
| C1 | CC45FCH1H680J | CAP. CERAMIC | 68P | 5% | 50V |
| C2 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C3 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C4 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C5 | CK45B1H102KTA | CAP. CERAMIC | 1000P | 10% | 50V |
| C6 | CK45B1H102KTA | CAP. CERAMIC | 1000P | 10% | 50V |
| C7 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C8 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C9 | CC45FCH1H040C | CAP. CERAMIC | 4P | 0.25P | 50V |
| C10 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C11 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C12 | CK45FB1H102K | CAP. CERAMIC | 1000P | 10% | 50V |
| C13 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C14 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C15 | CK45FB1H102K | CAP. CERAMIC | 1000P | 10% | 50V |
| C16 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C17 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C18 | CC45CH1H220JTA | CAP. CERAMIC | 22P | 5% | 50V |
| C19 | CC45CH1H220JTA | CAP. CERAMIC | 22P | 5% | 50V |
| C20 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C21 | CC45FSL1H471J | CAP. CERAMIC | 470P | 5% | 50V |
| C22 | NO USE | | | | |
| C23 | CE04LW1A221M | CAP. ELECTRO | 220 | 20% | 10V |
| C24 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C25 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C26 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C27 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C28 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C29 | CE04LW1A221M | CAP. ELECTRO | 220 | 20% | 10V |
| C30 | CE04LW1C221M | CAP. ELECTRO | 220 | 20% | 16V |
| C31 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C32 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C33 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C34 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C35 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C36 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C37 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C38 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C39 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C40 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C41 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C42 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C43 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C44 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C45 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C46 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C47 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C48 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C49 | CK45B1H102KTA | CAP. CERAMIC | 1000P | 10% | 50V |
| C50 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C77 | C91-2538-05 | CAP. FILM | 0.1 | 10% | 63V |
| C78 | CC45FCH1H181J | CAP. CERAMIC | 180P | 5% | 50V |
| C79 | NO USE | | | | |
| C80 | CC45FSL1H391J | CAP. CERAMIC | 390P | 5% | 50V |
| C81 | CC45FCH1H271J | CAP. CERAMIC | 270P | 5% | 50V |
| C82 | CC45FCH1H220J | CAP. CERAMIC | 22P | 5% | 50V |
| C83 | NO USE | | | | |
| C84 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C85 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C86 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C87 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C88 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C89 | CC45FSL1H471J | CAP. CERAMIC | 470P | 5% | 50V |
| C101 | CC45FCH1H151J | CAP. CERAMIC | 150P | 5% | 50V |
| C102 | NO USE | | | | |
| C103 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C104 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C105 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C106 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C107 | NO USE | | | | |
| C108 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C109 | CE04LW1C221M | CAP. ELECTRO | 220 | 20% | 16V |
| C110 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C111 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C112 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C115 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C124 | CC45FCH1H101J | CAP. CERAMIC | 100P | 5% | 50V |
| C125 | CC45FCH1H150J | CAP. CERAMIC | 15P | 5% | 50V |
| C126 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C127 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C128 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C201 | CC45FCH1H151J | CAP. CERAMIC | 150P | 5% | 50V |
| C202 | NO USE | | | | |
| C203 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C204 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C205 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C206 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C207 | NO USE | | | | |
| C208 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C209 | CE04LW1C221M | CAP. ELECTRO | 220 | 20% | 16V |
| C210 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C211 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C212 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C215 | CF92FV1H104J | CAP. POLYESTER | 0.1 | 5% | 50V |
| C224 | CC45FCH1H101J | CAP. CERAMIC | 100P | 5% | 50V |
| C225 | CC45FCH1H150J | CAP. CERAMIC | 15P | 5% | 50V |
| C226 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C227 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C228 | CE04LW1A101M | CAP. ELECTRO | 100 | 20% | 10V |
| C301 | CC45FCH1H220J | CAP. CERAMIC | 22P | 5% | 50V |
| C302 | CC45FCH1H050C | CAP. CERAMIC | 5P | 0.25P | 50V |
| C303 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C304 | CC45FCH1H050C | CAP. CERAMIC | 5P | 0.25P | 50V |
| C305 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C306 | CC45FCH1H050C | CAP. CERAMIC | 5P | 0.25P | 50V |
| C307 | CE04LW1A471M | CAP. ELECTRO | 470 | 20% | 10V |
| C801 | CF92V1H102J | CAP. POLYESTER | 1000P | 5% | 50V |
| CN502 | E40-7515-05 | PIN CONNECTOR | 3P | | |
| CN523 | E40-7532-05 | PIN CONNECTOR | 23P | | |
| CN524 | E40-7520-05 | PIN CONNECTOR | 30P | | |
| CN525 | E40-3243-05 | PIN CONNECTOR | 8P | | |
| CN526 | NO USE | | | | |
| CN527 | E40-5069-05 | PIN CONNECTOR | 12P | | |
| CN528 | E40-3242-05 | PIN CONNECTOR | 7P | | |
| CN531 | E40-7519-05 | PIN CONNECTOR | 4P | | |
| CN532 | E40-7519-05 | PIN CONNECTOR | 4P | | |
| D1 | MA700 | DIODE | | | |
| D2 | MA700 | DIODE | | | |
| D3 | 1SS132 | DIODE | | | |
| D4 | 1SS132 | DIODE | | | |
| D39 | 1SS132 | DIODE | | | |
| D100 | MA700 | DIODE | | | |
| D200 | MA700 | DIODE | | | |
| D301 | MA700 | DIODE | | | |
| IC1 | PST7045 | IC,RESET | | | |
| IC2 | MB88101APFV-GB | IC,4-CH 12-BIT A/D CONVERTER | | | |
| IC3 | NO USE | | | | |
| IC4 | HD14066BFP | IC,QUAD BILATERAL SWITCH | | | |
| IC5 | T93-0893-05 | PROGRAM ROM | | | |
| IC6 | T93-0894-05 | PROGRAM ROM | | | |
| IC7 | HD74LS32FP | IC,QUAD 2-INPUT OR GATE | | | |
| IC8 | HD74LS32FP | IC,QUAD 2-INPUT OR GATE | | | |
| IC9 | HD74LS74FP | IC,DUAL D-F.F. (WITH PR&CLR) | | | |
| IC10 | HD74LS244FP | IC,OCTAL 3-STATE BUS BUFFER | | | |
| IC11 | HD74HC86FP | IC,QUAD EXCLUSIVE OR GATE | | | |
| IC12 | HD74HC08FP | IC,QUAD 2-INPUT AND GATE | | | |
| IC13 | HD74LS138FP | IC,3-TO-8 DEMULTIPLEXER | | | |
| IC14 | HD74LS138FP | IC,3-TO-8 DEMULTIPLEXER | | | |
| IC15 | HD74LS244FP | IC,OCTAL 3-STATE BUS BUFFER | | | |
| IC16 | HD74LS138FP | IC,3-TO-8 DEMULTIPLEXER | | | |
| IC17 | CTM5290 | IC,GATE ARRAY | | | |
| IC18 | HD64610FP | IC,CALENDER CLOCK | | | |
| IC19 | 62256BLFP7SL | IC,SRAM 256K | | | |
| IC20 | HD74LS157FP | IC,2 TO 1 DATA SELECT./MPX | | | |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| IC21 | HD74LS157FP | IC,2 TO 1 DATA SELECT./MPX | | | |
| IC22 | HD74LS157FP | IC,2 TO 1 DATA SELECT./MPX | | | |
| IC23 | HD74LS157FP | IC,2 TO 1 DATA SELECT./MPX | | | |
| IC24 | 62256BLFP7SL | IC,SRAM 256K | | | |
| IC25 | 62256BLFP7SL | IC,SRAM 256K | | | |
| IC26 | HD6433040A00F | IC,16-BIT MICROCESSOR | | | |
| IC27 | HD74HC245FP | IC,OCTAL BUS TRANSCEIVERS | | | |
| IC28 | HD74LS244FP | IC,OCTAL 3-STATE BUS BUFFER | | | |
| IC29 | HD74HC244FP | IC,OCTAL BUS BUFFER | | | |
| IC30 | HD74LS244FP | IC,OCTAL 3-STATE BUS BUFFER | | | |
| IC31 | HD74LS374FP | IC,OCTAL 3-STATE D-FF | | | |
| IC32 | DAC0808LCM | IC,8-BIT D/A CONVERTER | | | |
| IC33 | HA17012PB | IC,12-BIT D/A CONVERTER | | | |
| IC34 | HA17012PB | IC,12-BIT D/A CONVERTER | | | |
| IC35 | UPC814C | IC,JFET INPUT OP-AMP | | | |
| IC36 | NJM072BD | IC,JFET INPUT OP AMP | | | |
| IC37 | SN74AS74NS | IC,DUAL D-F.F. (WITH PR & CLR) | | | |
| IC38 | SN74AS151NS | IC,8 TO 1 DATA SELECTOR/MPX | | | |
| IC39 | HD74HC123FP | IC,DUAL MONOSTABLE MULTIB. | | | |
| IC40 | SN74AS153NS | IC,4 TO 1 DATA SELECTOR/MPX | | | |
| IC41 | MB86001PF-GBND | IC,PLL FREOUENCY SYNTHESIZER | | | |
| IC42 | SN74F161ANS | IC,SYNC. 4-BIT BINARY COUNTER | | | |
| IC43 | SN74AS00NS | IC,2-INPUT NAND GATE | | | |
| IC44 | SN74AS74NS | IC,DUAL D-F.F. (WITH PR & CLR) | | | |
| IC45 | CTM5300 | IC,GATE ARRAY | | | |
| IC46 | HD74LS374FP | IC,OCTAL 3-STATE D-FF | | | |
| IC47 | HD74LS138FP | IC,3-TO-8 DEMULTIPLEXER | | | |
| IC100 | AN8122FAP | IC,8-BIT A/D CONVERTER | | | |
| IC101 | NO USE | | | | |
| IC102 | DTM6010 | IC,GATE ARRAY | | | |
| IC103 | HM63021FP-34 | IC,CMOS STATIC RAM | | | |
| IC104 | HM63021FP-34 | IC,CMOS STATIC RAM | | | |
| IC200 | AN8122FAP | IC,8-BIT A/D CONVERTER | | | |
| IC201 | NO USE | | | | |
| IC202 | DTM6010 | IC,GATE ARRAY | | | |
| IC203 | HM63021FP-34 | IC,CMOS STATIC RAM | | | |
| IC204 | HM63021FP-34 | IC,CMOS STATIC RAM | | | |
| L3 | L79-0553-05 | FILTER | | | |
| L4 | L79-0553-05 | FILTER | | | |
| L5 | L40-2281-17 | FERRI INDUCTOR | 0.22UH | | |
| L6 | NO USE | | | | |
| L7 | L79-0553-05 | FILTER | | | |
| L301 | L40-2281-17 | FERRI INDUCTOR | 0.22UH | | |
| L302 | L79-0553-05 | FILTER | | | |
| L303 | L79-0553-05 | FILTER | | | |
| Q1 | 2SC4049 | TR. SI, NPN | | | |
| Q2 | 2SA933S(R,S) | TR. SI, PNP | | | |
| Q101 | 2SC1923(0) | TR. SI, NPN | | | |
| Q102 | 2SC1923(0) | TR. SI, NPN | | | |
| Q103 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q201 | 2SC1923(0) | TR. SI, NPN | | | |
| Q202 | 2SC1923(0) | TR. SI, NPN | | | |
| Q203 | 2SC1740S(R,S) | TR. SI, NPN | | | |
| Q301 | 2SC3354(S) | TR. SI, NPN | | | |
| Q302 | 2SC3354(S) | TR. SI, NPN | | | |
| R1 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R2 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R3 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R4 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R5 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R6 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R7 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R8 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R9 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R10 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R11 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R12 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R13 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R14 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R15 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R16 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R17 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R18 | RN14BK2C1001F | RES. METAL FILM | 1K | 1% | 1/6W |
| R19 | RN14BK2C1202F | RES. METAL FILM | 12K | 1% | 1/6W |
| R20 | RN14BK2C1202F | RES. METAL FILM | 12K | 1% | 1/6W |
| R21 | RN14BK2C1201F | RES. METAL FILM | 1.2K | 1% | 1/6W |
| R22 | RN14BK2C2001F | RES. METAL FILM | 2K | 1% | 1/6W |
| R23 | RN14BK2C1202F | RES. METAL FILM | 12K | 1% | 1/6W |
| R24 | RN14BK2C1202F | RES. METAL FILM | 12K | 1% | 1/6W |
| R25 | RD14BB2C330J | RES. CARBON | 33 | 5% | 1/6W |
| R26 | RN14BK2C1201F | RES. METAL FILM | 1.2K | 1% | 1/6W |
| R27 | RD14BB2C330J | RES. CARBON | 33 | 5% | 1/6W |
| R28 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R29 | RN14BK2C1001F | RES. METAL FILM | 1K | 1% | 1/6W |
| R30 | RN14BK2C1501F | RES. METAL FILM | 1.5K | 1% | 1/6W |
| R31 | RN14BK2C3001F | RES. METAL FILM | 3K | 1% | 1/6W |
| R32 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R33 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R34 | RD14BB2C134J | RES. CARBON | 130K | 5% | 1/6W |
| R35 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R36 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R37 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R38 | RD14BB2C303J | RES. CARBON | 30K | 5% | 1/6W |
| R39 | RD14BB2C474J | RES. CARBON | 470K | 5% | 1/6W |
| R40 | RD14BB2C752J | RES. CARBON | 7.5K | 5% | 1/6W |
| R41 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R42 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R43 | RD14BB2C681J | RES. CARBON | 680 | 5% | 1/6W |
| R44 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R45 | NO USE | | | | |
| R46 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R47 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R48 | NO USE | | | | |
| R49 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R50 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R51 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R52 | RD14BB2C513J | RES. CARBON | 51K | 5% | 1/6W |
| R53 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R54 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R55 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R56 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R57 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R58 | RD14BB2C104J | RES. CARBON | 100K | 5% | 1/6W |
| R59 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R60 | RD14BB2C471J | RES. CARBON | 470 | 5% | 1/6W |
| R61 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R62 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R63 | NO USE | | | | |
| R64 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R65 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R66 | RD14BB2C512J | RES. CARBON | 5.1K | 5% | 1/6W |
| R67 | RD14BB2C512J | RES. CARBON | 5.1K | 5% | 1/6W |
| R68 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R73 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R74 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R75 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R76 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R77 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R78 | RD14BB2C273J | RES. CARBON | 27K | 5% | 1/6W |
| R79 | RD14BB2C390J | RES. CARBON | 39 | 5% | 1/6W |
| R100 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R103 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R104 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R105 | RN14BK2C3901F | RES. METAL FILM | 3.9K | 1% | 1/6W |
| R106 | RN14BK2C3901F | RES. METAL FILM | 3.9K | 1% | 1/6W |
| R107 | RN14BK2C1601F | RES. METAL FILM | 1.6K | 1% | 1/6W |
| R108 | RN14BK2C1601F | RES. METAL FILM | 1.6K | 1% | 1/6W |
| R109 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R110 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R111 | RD14BB2C271J | RES. CARBON | 270 | 5% | 1/6W |
| R112 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R113 | NO USE | | | | |
| R114 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R115 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R116 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R119 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R120 | RD14BB2C510J | RES. CARBON | 51 | 5% | 1/6W |
| R203 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R204 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R205 | RN14BK2C3901F | RES. METAL FILM | 3.9K | 1% | 1/6W |
| R206 | RN14BK2C3901F | RES. METAL FILM | 3.9K | 1% | 1/6W |
| R207 | RN14BK2C1601F | RES. METAL FILM | 1.6K | 1% | 1/6W |
| R208 | RN14BK2C1601F | RES. METAL FILM | 1.6K | 1% | 1/6W |
| R209 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R210 | RN14BK2C3301F | RES. METAL FILM | 3.3K | 1% | 1/6W |
| R211 | RD14BB2C271J | RES. CARBON | 270 | 5% | 1/6W |
| R212 | RD14BB2C153J | RES. CARBON | 15K | 5% | 1/6W |
| R213 | NO USE | | | | |
| R214 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R215 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R216 | RD14BB2C222J | RES. CARBON | 2.2K | 5% | 1/6W |
| R219 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R220 | RD14BB2C510J | RES. CARBON | 51 | 5% | 1/6W |
| R301 | RD14BB2C103J | RES. CARBON | 10K | 5% | 1/6W |
| R302 | RD14BB2C152J | RES. CARBON | 1.5K | 5% | 1/6W |
| R303 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R304 | NO USE | | | | |
| R305 | RN14BK2C3602F | RES. METAL FILM | 36K | 1% | 1/6W |
| R306 | RN14BK2C7501F | RES. METAL FILM | 7.5K | 1% | 1/6W |
| R307 | RD14BB2C302J | RES. CARBON | 3K | 5% | 1/6W |
| R801 | R92-0150-05 | JUMPING RES. | ZERO OHM(10MM) | | |
| R802 | R92-0150-05 | JUMPING RES. | ZERO OHM(10MM) | | |
| VR101 | R12-0889-05 | RES. SEMI FIXED | 220 B | | |
| VR102 | R12-0889-05 | RES. SEMI FIXED | 220 B | | |
| VR201 | R12-0889-05 | RES. SEMI FIXED | 220 B | | |
| VR202 | R12-0889-05 | RES. SEMI FIXED | 220 B | | |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| X1 | L77-2505-05 | CRYSTAL RESONATOR |
| X2 | L77-1229-05 | CRYSTAL RESONATOR |
| X3 | L78-0134-05 | CERAMIC RESONATOR |

## FINAL UNIT

### X80-1370-00

X80-1370-00

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | E01-0103-05 | CRT SOCKET | | | |
| | E23-0149-05 | GND TERMINAL | | | |
| | F01-2317-04 | HEAT SINK;Q113,114 | | | |
| | F01-2318-04 | HEAT SINK;Q1,2 | | | |
| | J73-0285-22 | PCB (UNMOUNTED) | | | |
| | N09-0623-04 | SCREW,SEMS PAN HD M3X8 | | | |
| C1 | CK45FB1H152K | CAP. CERAMIC | 1500P | 10% | 50V |
| C2 | NO USE | | | | |
| C3 | C90-3178-05 | CAP. METAL FILM | 0.047 | | 5.5V |
| C4 | C90-3178-05 | CAP. METAL FILM | 0.047 | | 5.5V |
| C5 | NO USE | | | | |
| C6 | CF92FV1H102J | CAP. POLYESTER | 1000P | 5% | 50V |
| C7 | CC45FCH1H820J | CAP. CERAMIC | 82P | 5% | 50V |
| C8 | CF92FV1H102J | CAP. POLYESTER | 1000P | 5% | 50V |
| C9 | CF92FV1H102J | CAP. POLYESTER | 1000P | 5% | 50V |
| C10 | CC45FCH1H070D | CAP. CERAMIC | 7P | 0.5P | 50V |
| C11 | CC45FCH1H470J | CAP. CERAMIC | 47P | 5% | 50V |
| C12 | CC45FCH1H020C | CAP. CERAMIC | 2P | 0.25P | 50V |
| C13 | CC45FCH1H180J | CAP. CERAMIC | 18P | 5% | 50V |
| C14 | CC45FCH1H151J | CAP. CERAMIC | 150P | 5% | 50V |
| C15 | CC45FCH1H030C | CAP. CERAMIC | 3P | 0.25P | 50V |
| C16 | CC45FCH1H030C | CAP. CERAMIC | 3P | 0.25P | 50V |
| C101 | CE04LW1E101M | CAP. ELECTRO | 100 | 20% | 25V |
| C102 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C103 | CE04LW1E101M | CAP. ELECTRO | 100 | 20% | 25V |
| C104 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C105 | NO USE | | | | |
| C106 | C91-1357-05 | CAP. POLYESTER | 0.1 | 10% | 100V |
| C107 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C108 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C109 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C201 | C91-2583-05 | CAP. CERAMIC | 0.1 | 20% | 250V |
| C202 | C91-2584-05 | CAP. CERAMIC | 1000P | 10% | 400V |
| C203 | C91-2584-05 | CAP. CERAMIC | 1000P | 10% | 400V |
| C207 | CE04LW1E220M | CAP. ELECTRO | 22 | 20% | 25V |
| C208 | C91-0769-05 | CAP. CERAMIC | 0.01 | 20% | 16V |
| C209 | CE04LW0J101M | CAP. ELECTRO | 100 | 20% | 6.3V |
| JW5 | E38-0997-05 | WIRE ASS'Y;CRT TO FINAL | | | |
| JW6 | NO USE | | | | |
| JW7 | E38-0998-05 | WIRE ASS'Y;CRT TO H | | | |
| JW13 | E38-0999-05 | WIRE ASS'Y;BNC TO V | | | |
| L1 | L40-2201-17 | FERRI INDUCTOR | 22UH | 10% | |
| L2 | L40-1001-17 | FERRI INDUCTOR | 10UH | 10% | |
| L61 | L40-1291-17 | FERRI INDUCTOR | 1.2UH | 10% | |
| L62 | L40-2791-17 | FERRI INDUCTOR | 2.7UH | 10% | |
| L63 | L40-1291-17 | FERRI INDUCTOR | 1.2UH | 10% | |
| L64 | L40-2791-17 | FERRI INDUCTOR | 2.7UH | 10% | |
| L201 | L33-0808-05 | CHOKE COIL | 1000UH | | |
| L202 | L40-1291-17 | FERRI INDUCTOR | 1.2UH | 10% | |
| L203 | L40-1291-17 | FERRI INDUCTOR | 1.2UH | 10% | |
| P4 | E40-7515-05 | PIN CONNECTOR | 3P | | |
| P5 | E40-3300-05 | PIN CONNECTOR | 3P | | |
| P14 | E40-5066-05 | PIN CONNECTOR | 9P | | |
| P18 | E40-7518-05 | PIN CONNECTOR | 6P | | |
| P19 | E40-7515-05 | PIN CONNECTOR | 3P | | |
| P20 | NO USE | | | | |
| P21 | E40-7412-05 | PIN CONNECTOR | 2P | | |
| P22 | E40-7413-05 | PIN CONNECTOR | 6P | | |
| P105 | E40-7515-05 | PIN CONNECTOR | 3P | | |
| P114 | E40-7517-05 | PIN CONNECTOR | 5P | | |
| P201 | E04-0277-05 | BNC CONNECTOR | | | |
| Q1 | 2SA1161 | TR. SI, PNP | | | |
| Q2 | 2SA1161 | TR. SI, PNP | | | |
| Q3 | 2SC3779(D) | TR. SI, NPN | | | |
| Q4 | 2SC3779(D) | TR. SI, NPN | | | |
| Q9 | 2SC2644 | TR. SI, NPN | | | |
| Q10 | 2SC2644 | TR. SI, NPN | | | |
| Q11 | 2SC2644 | TR. SI, NPN | | | |
| Q12 | 2SC2644 | TR. SI, NPN | | | |
| Q105 | 2SC1907 | TR. SI, NPN | | | |
| Q106 | 2SC1907 | TR. SI, NPN | | | |
| Q107 | 2SC1907 | TR. SI, NPN | | | |
| Q108 | 2SC1907 | TR. SI, NPN | | | |
| Q113 | 2SC3952(D) | TR. SI, NPN | | | |
| Q114 | 2SC3952(D) | TR. SI, NPN | | | |
| Q201 | 2SC3779(D) | TR. SI, NPN | | | |
| Q202 | 2SC3779(D) | TR. SI, NPN | | | |
| R1 | RD14BB2C202J | RES. CARBON | 2K | 5% | 1/6W |
| R2 | RD14BB2C182J | RES. CARBON | 1.8K | 5% | 1/6W |
| R3 | RD14BB2E822J | RES. CARBON | 8.2K | 5% | 1/4W |
| R4 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R5 | RD14BB2C131J | RES. CARBON | 130 | 5% | 1/6W |
| R6 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R7 | RD14BB2C751J | RES. CARBON | 750 | 5% | 1/6W |
| R8 | RD14BB2C911J | RES. CARBON | 910 | 5% | 1/6W |
| R9 | RD14BB2C911J | RES. CARBON | 910 | 5% | 1/6W |
| R10 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R11 | RD14BB2C132J | RES. CARBON | 1.3K | 5% | 1/6W |
| R12 | RD14BB2C132J | RES. CARBON | 1.3K | 5% | 1/6W |
| R13 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R14 | RD14BB2E273J | RES. CARBON | 27K | 5% | 1/4W |
| R15 | R92-1575-05 | RES. LINEAR PCT | 100 | 5% | 1/6W |
| R16 | R92-1575-05 | RES. LINEAR PCT | 100 | 5% | 1/6W |
| R17 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R18 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R19 | RD14BB2C113J | RES. CARBON | 11K | 5% | 1/6W |
| R20 | RD14BB2C681J | RES. CARBON | 680 | 5% | 1/6W |
| R21 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R22 | RN14BK2C5600F | RES. METAL FILM | 560 | 1% | 1/6W |
| R23 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R24 | RD14BB2C303J | RES. CARBON | 30K | 5% | 1/6W |
| R25 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R26 | RD14BB2C221J | RES. CARBON | 220 | 5% | 1/6W |
| R27 | RD14BB2C132J | RES. CARBON | 1.3K | 5% | 1/6W |
| R28 | RD14BB2C132J | RES. CARBON | 1.3K | 5% | 1/6W |
| R29 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R30 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R34 | RD14BB2C473J | RES. CARBON | 47K | 5% | 1/6W |
| R35 | RD14BB2C623J | RES. CARBON | 62K | 5% | 1/6W |
| R36 | RD14BB2C203J | RES. CARBON | 20K | 5% | 1/6W |
| R37 | RD14BB2E752J | RES. CARBON | 7.5K | 5% | 1/4W |
| R38 | NO USE | | | | |
| R39 | RD14BB2C182J | RES. CARBON | 1.8K | 5% | 1/6W |
| R40 | NO USE | | | | |
| R41 | RD14BB2C680J | RES. CARBON | 68 | 5% | 1/6W |
| R42 | RD14BB2C621J | RES. CARBON | 620 | 5% | 1/6W |
| R43 | RD14BB2C621J | RES. CARBON | 620 | 5% | 1/6W |
| R44 | RD14BB2C562J | RES. CARBON | 5.6K | 5% | 1/6W |
| R45 | RD14BB2C362J | RES. CARBON | 3.6K | 5% | 1/6W |
| R46 | RD14BB2C911J | RES. CARBON | 910 | 5% | 1/6W |
| R47 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R48 | RD14BB2C102J | RES. CARBON | 1K | 5% | 1/6W |
| R49 | RD14BB2C151J | RES. CARBON | 150 | 5% | 1/6W |
| R50 | RD14BB2C151J | RES. CARBON | 150 | 5% | 1/6W |
| R51 | RD14BB2E220J | RES. CARBON | 22 | 5% | 1/4W |
| R52 | RD14BB2E220J | RES. CARBON | 22 | 5% | 1/4W |
| R53 | RD14BB2C1R0J | RES. CARBON | 1 | 5% | 1/6W |
| R54 | RD14BB2C1R0J | RES. CARBON | 1 | 5% | 1/6W |
| R59 | RD14BB2C242J | RES. CARBON | 2.4K | 5% | 1/6W |
| R60 | NO USE | | | | |
| R61 | RD14BB2C431J | RES. CARBON | 430 | 5% | 1/6W |
| R62 | RD14BB2C431J | RES. CARBON | 430 | 5% | 1/6W |
| R63 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R64 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R65 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R66 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R67 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R68 | RD14BB2C101J | RES. CARBON | 100 | 5% | 1/6W |
| R69 | RD14BB2C223J | RES. CARBON | 22K | 5% | 1/6W |
| R70 | RD14BB2C391J | RES. CARBON | 390 | 5% | 1/6W |
| R71 | RD14BB2C220J | RES. CARBON | 22 | 5% | 1/6W |
| R72 | RN14BK2C62R0F | RES. METAL FILM | 62.0 | 1% | 1/6W |
| R73 | R92-1568-05 | RES. SPECIAL POWER | 200 | 5% | 1W |
| R74 | R92-1568-05 | RES. SPECIAL POWER | 200 | 5% | 1W |
| R75 | R92-1571-05 | RES. SPECIAL POWER | 110 | 5% | 1W |
| R76 | R92-1571-05 | RES. SPECIAL POWER | 110 | 5% | 1W |
| R77 | R92-1571-05 | RES. SPECIAL POWER | 110 | 5% | 1W |
| R78 | R92-1571-05 | RES. SPECIAL POWER | 110 | 5% | 1W |
| R79 | RD14BB2E2R2J | RES. CARBON | 2.2 | 5% | 1/4W |
| R80 | RD14BB2E2R2J | RES. CARBON | 2.2 | 5% | 1/4W |
| R81 | RD14BB2C391J | RES. CARBON | 390 | 5% | 1/6W |
| R85 | R92-1570-05 | RES. SPECIAL POWER | 750 | 5% | 2W |
| R86 | R92-1570-05 | RES. SPECIAL POWER | 750 | 5% | 2W |
| R87 | R92-1570-05 | RES. SPECIAL POWER | 750 | 5% | 2W |
| R88 | R92-1570-05 | RES. SPECIAL POWER | 750 | 5% | 2W |
| R89 | R92-1570-05 | RES. SPECIAL POWER | 750 | 5% | 2W |
| R90 | R92-1570-05 | RES. SPECIAL POWER | 750 | 5% | 2W |
| R91 | R92-1570-05 | RES. SPECIAL POWER | 750 | 5% | 2W |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| R92 | R92-1570-05 | RES. SPECIAL POWER 750 5% 2W |
| R93 | RD14BB2C220J | RES. CARBON 22 5% 1/6W |
| R94 | NO USE | |
| R95 | RD14BB2C220J | RES. CARBON 22 5% 1/6W |
| R96 | NO USE | |
| R97 | RD14BB2C104J | RES. CARBON 100K 5% 1/6W |
| R98 | RD14BB2C104J | RES. CARBON 100K 5% 1/6W |
| R201 | R92-0173-05 | RES. FIXED 2.2M 20% 350V |
| R202 | NO USE | |
| R203 | RD14BB2C471J | RES. CARBON 470 5% 1/6W |
| R204 | RD14BB2C471J | RES. CARBON 470 5% 1/6W |
| R205 | RD14BB2C272J | RES. CARBON 2.7K 5% 1/6W |
| R206 | NO USE | |
| R207 | RD14BB2C201J | RES. CARBON 200 5% 1/6W |
| R208 | RD14BB2C100J | RES. CARBON 10 5% 1/6W |
| R209 | RD14BB2C151J | RES. CARBON 150 5% 1/6W |
| R210 | RD14BB2C470J | RES. CARBON 47 5% 1/6W |
| R211 | RD14BB2C104J | RES. CARBON 100K 5% 1/6W |
| R212 | RD14BB2C101J | RES. CARBON 100 5% 1/6W |
| R213 | RD14BB2E223J | RES. CARBON 22K 5% 1/4W |
| R214 | RD14BB2E223J | RES. CARBON 22K 5% 1/4W |
| R215 | RD14BB2C101J | RES. CARBON 100 5% 1/6W |
| R216 | RD14BB2C222J | RES. CARBON 2.2K 5% 1/6W |
| R217 | RD14BB2C222J | RES. CARBON 2.2K 5% 1/6W |
| TC1 | C05-0472-05 | CAP. TRIMMER 50P |
| TC62 | C05-0472-05 | CAP. TRIMMER 50P |
| TH1 | 112-103-2FM | THERMISTOR |
| TH2 | 112-103-2FM | THERMISTOR |
| U1 | KMG01 | IC,LINEAR |
| VR1 | R12-1857-05 | RES. SEMI FIXED 1K |
| VR2 | R12-0679-05 | RES. SEMI FIXED 22KB |
| VR3 | R12-1860-05 | RES. SEMI FIXED 1KB |
| VR4 | R12-0679-05 | RES. SEMI FIXED 22KB |

## Option

## IF-10 GP-IB

### Y87-3240-00

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| | B42-1933-04 | LABEL,MODEL NO.,FOR CARTON BOX |
| | B42-3819-05 | SERIAL NO. PLATE |
| | B42-3820-05 | LABEL;CARTON BOX |
| | B63-0263-00 | INSTRUCTION MANUAL;ENG./JAP. |
| | H25-0835-04 | VINYL COVER |
| | H53-0183-04 | CARTON BOX |
| 56 | A63-0208-04 | PANEL |
| 57 | X72-1270-00 | INTERFACE UNIT |

## INTERFACE UNIT

### X72-1270-00

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| | J73-0391-03 | PCB (UNMOUNTED) |
| | N10-2026-41 | NUT,HEX M2 |
| | N30-2612-41 | SCREW,PAN HD M2.6X12 |
| | N67-3010-41 | SCREW,SEMS PAN HD M3X10 |
| C1 | C91-1315-05 | CAP. CERAMIC 0.1 80/-20% 50V |
| C2 | C91-1315-05 | CAP. CERAMIC 0.1 80/-20% 50V |
| C3 | C91-1315-05 | CAP. CERAMIC 0.1 80/-20% 50V |
| C4 | C91-1315-05 | CAP. CERAMIC 0.1 80/-20% 50V |
| C5 | CE04FW1A470M | CAP. ELECTRO 47 20% 10V |
| CN529 | E40-7531-05 | PIN CONNECTOR 30P |
| CP1 | R90-0612-05 | RES. NETWORK 8X4.7K |
| IC1 | TMS99C14ANL | IC,GP-IB ADAPTER |
| IC2 | SN75160AN | IC,INTERFACE BUS TRANSCEIVER |
| IC3 | SN75161AN | IC,INTERFACE BUS TRANSCEIVER |
| IC4 | TC74HC244AP | IC,OCTAL BUS BUFFER (3-STATE) |
| IC5 | TC74HC138AP | IC,3 TO 8 LINE DECODER |
| J305 | E58-0613-05 | PIN CONNECTOR 24P |
| R1 | R92-1061-05 | JUMPING RES. ZERO OHM (5MM) |
| S1 | S79-0613-05 | DIP SWITCH |

## Option

## IF-20 RS-232C

### X87-3250-00

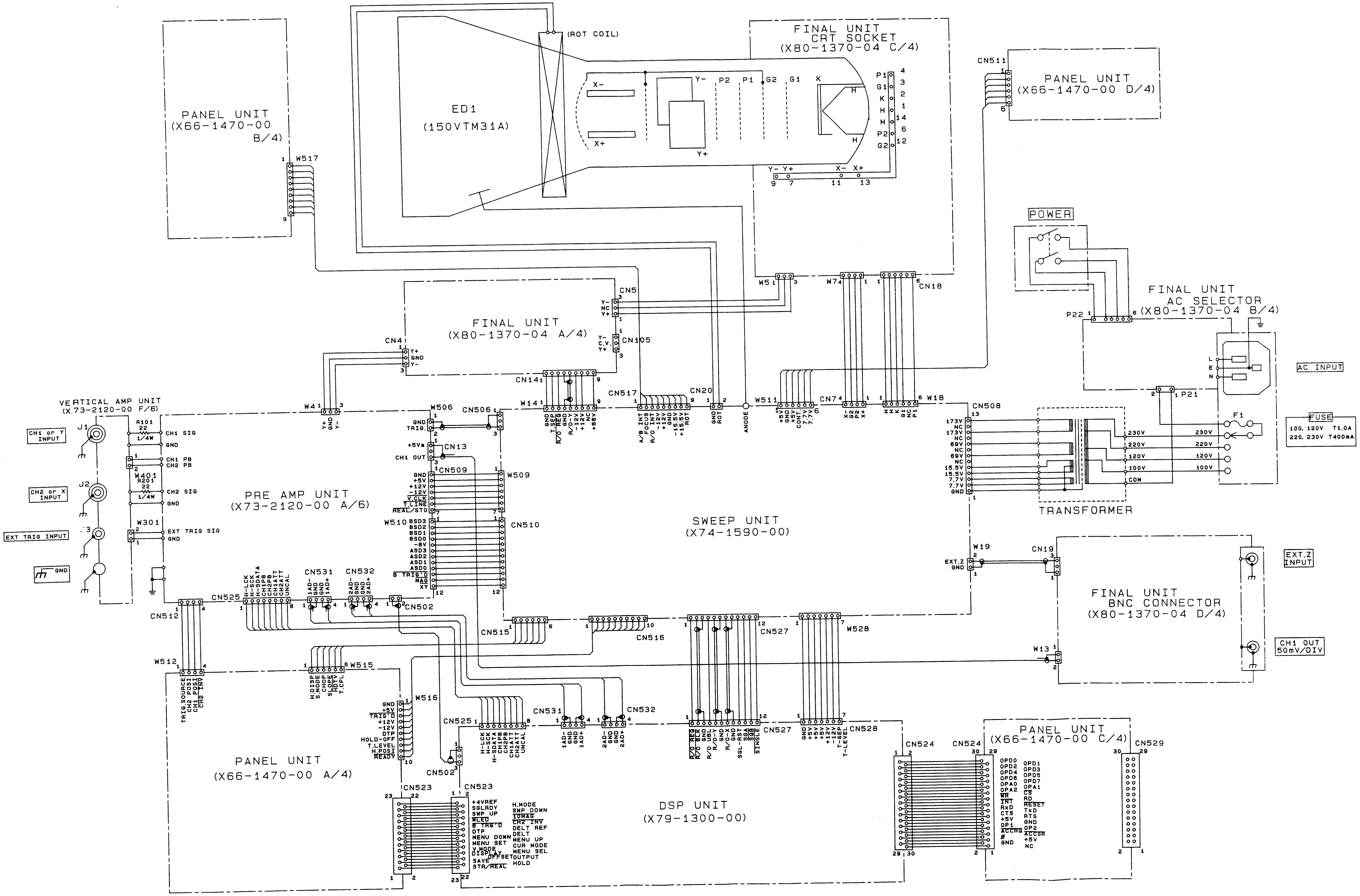
| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| | B42-1933-04 | LABEL,MODEL NO.,FOR CARTON BOX |
| | B42-3819-05 | SERIAL NO. PLATE |
| | B42-3820-05 | LABEL;CARTON BOX |
| | B63-0264-00 | INSTRUCTION MANUAL;ENG./JAP. |
| | H25-0835-04 | VINYL COVER |
| | H53-0183-04 | CARTON BOX |
| 56 | A63-0209-04 | PANEL |
| 57 | X72-1280-00 | INTERFACE UNIT |

## INTERFACE UNIT

### X72-1280-00

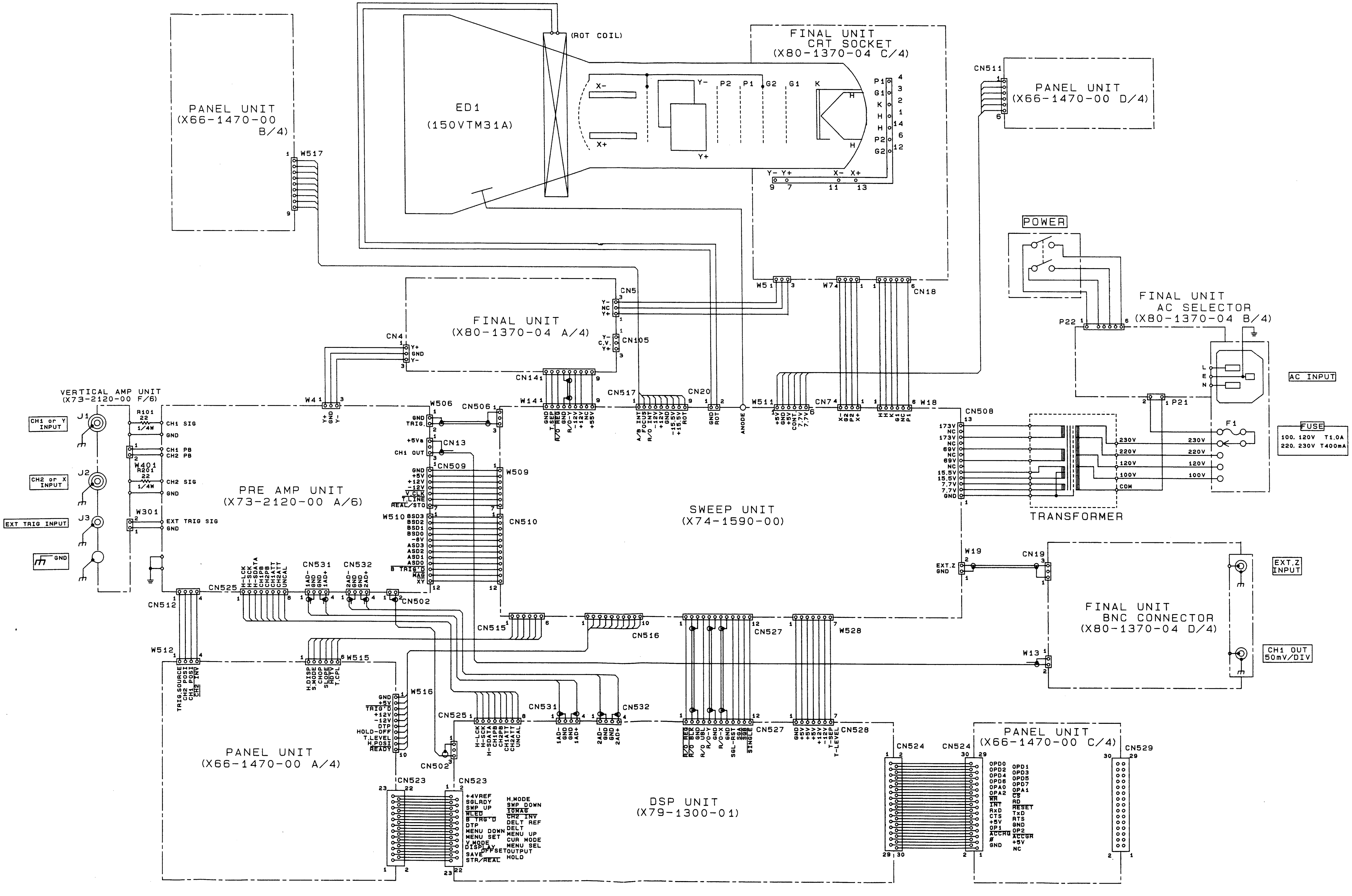
| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| | J73-0392-03 | PCB (UNMOUNTED) |
| | N10-2026-41 | NUT,HEX M2 |
| | N30-2612-41 | SCREW,PAN HD M2.6X12 |
| | N67-3010-41 | SCREW,SEMS PAN HD M3X10 |
| C1 | CE04EW1C220M | CAP. ELECTRO 22 20% 16V |
| C2 | CE04EW1C220M | CAP. ELECTRO 22 20% 16V |
| C3 | CE04EW1C220M | CAP. ELECTRO 22 20% 16V |
| C4 | CE04EW1C220M | CAP. ELECTRO 22 20% 16V |
| C5 | CE04EW1C100M | CAP. ELECTRO 10 20% 16V |
| C6 | C91-1315-05 | CAP. CERAMIC 0.1 80/-20% 50V |
| C7 | C91-1315-05 | CAP. CERAMIC 0.1 80/-20% 50V |
| CN529 | E40-7531-05 | PIN CONNECTOR 30P |
| CP1 | R90-0612-05 | RES. NETWORK 8X4.7K |
| IC1 | MAX232CPE | IC,RS-232C DRIVERS/RECEIVERS |
| IC2 | TC74HC244AP | IC,OCTAL BUS BUFFER (3-STATE) |
| IC3 | TC74HC138AP | IC,3 TO 8 LINE DECODER |
| J306 | E40-7231-05 | PIN CONNECTOR 25P |
| S1 | S79-0613-05 | DIP SWITCH |

# DCS-7020 SCHEMATIC DIAGRAM



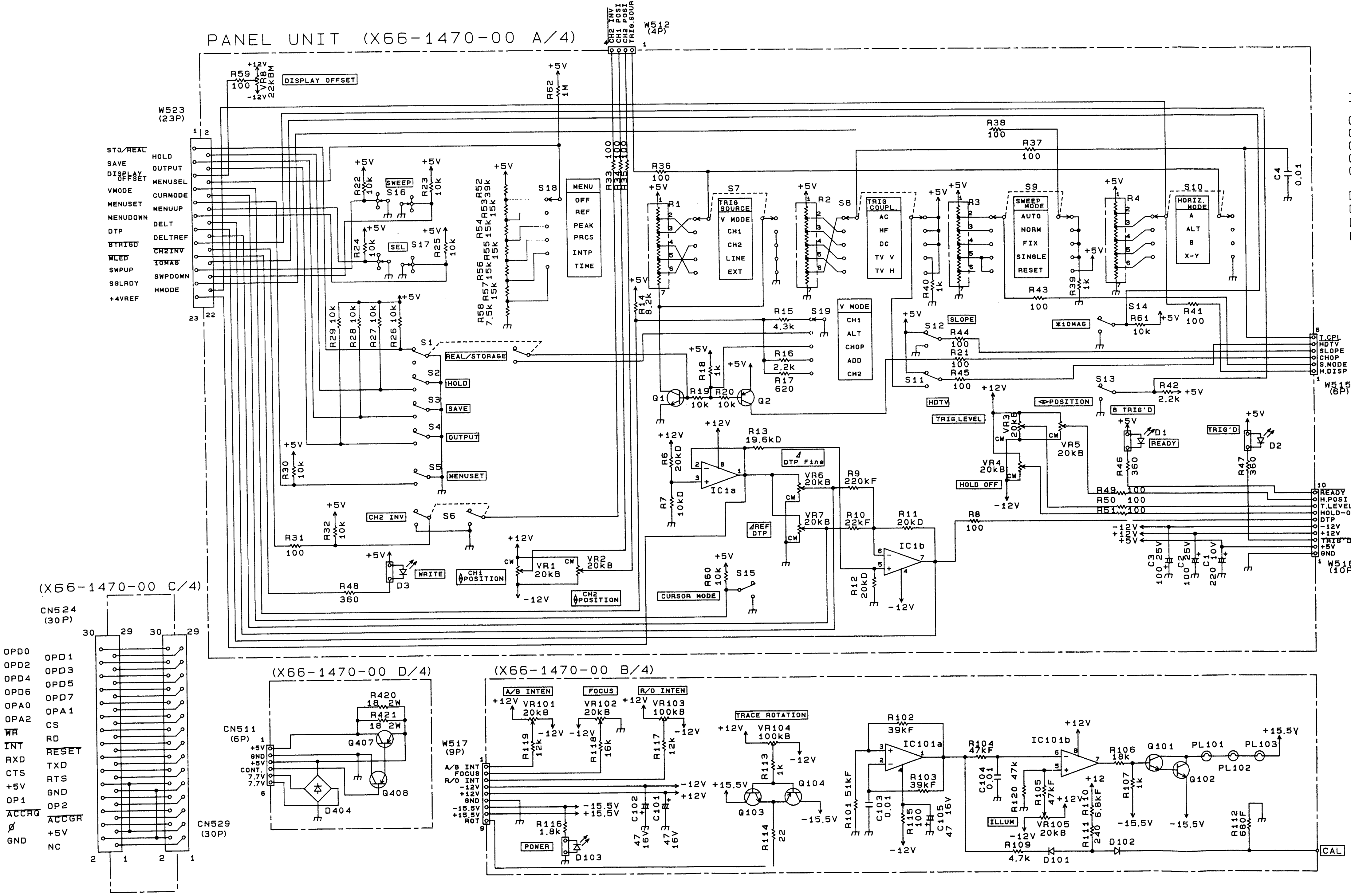
PANEL UNIT (X66-1470-00 B/4)
W517
ED1 (150VTM31A)
(ROT COIL)
FINAL UNIT CRT SOCKET (X80-1370-04 C/4)
X-
X+
Y-
Y+
P2
P1
G2
G1
K
H
P1 G1 K H H P2 G2
4 3 2 1 14 6 12
Y- Y+ X- X+
9 7 11 13
CN511
PANEL UNIT (X66-1470-00 D/4)
POWER
FINAL UNIT AC SELECTOR (X80-1370-04 B/4)
P22
P21
AC INPUT
L
E
N
F1
FUSE
100, 120V T1.0A
220, 230V T400mA
230V
220V
120V
100V
COM
TRANSFORMER
W5
W7
CN18
FINAL UNIT (X80-1370-04 A/4)
CN5
Y- NC Y+
CN105
CN4
Y+ GND Y-
CN14
CN517
CN20
W4
W506
CN506
W14
W511
CN74
W18
CN508
173V NC 173V NC 69V NC 69V NC 15.5V 15.5V 7.7V 7.7V GND
ANODE
GND ROT
A/B INT FOCUS R/O INT -12V +12V GND -15.5V +15.5V ROT
+5V GND +5V CONT. 7.7V 7.7V
X- G2 P2 X+
H H R1 NC P1
GND T SEP R/O GND R/ADV +12V +NC +55V
VERTICAL AMP UNIT (X73-2120-00 F/6)
CH1 or Y INPUT
CH2 or X INPUT
EXT TRIG INPUT
GND
J1
J2
J3
R101 22 1/4W
W401
R201 22 1/4W
W301
CH1 SIG
GND
CH1 PB
CH2 PB
CH2 SIG
EXT TRIG SIG
PRE AMP UNIT (X73-2120-00 A/6)
GND TRIG
+5Va
CN13
CH1 OUT
CN509
W509
GND +5V +12V -12V V.CLK T.LINE REAL/STO
W510
CN510
BSD3 BSD2 BSD1 BSD0 -8V ASD3 ASD2 ASD1 ASD0 B TRIG'D MAG XY
SWEEP UNIT (X74-1590-00)
W19
CN19
EXT.Z GND
EXT.Z INPUT
FINAL UNIT BNC CONNECTOR (X80-1370-04 D/4)
W13
CH1 OUT 50mV/DIV
CN525
H-LCK H-SCK H-SDATA CH1PB CH2PB CH1ATT CH2ATT UNCAL
CN531
1AD- GND GND 1AD+
CN532
2AD- GND GND 2AD+
CN502
CN512
CN515
CN516
CN527
W528
W512
TRIG.SOURCE CH2 POSI CH1 POSI CH2 INV
W515
H.DISP S.MODE CHOP SLOPE HDTV T.CPL
W516
GND +5V TRIG D +12V -12V DTP HOLD-OFF T.LEVEL H.POSI READY
PANEL UNIT (X66-1470-00 A/4)
CN523
+4VREF SGLRDY SWP UP MLED B TRIG'D DTP MENU DOWN MENU SET V.MODE DISPLAY SAVE STR/REAL
H.MODE SWP DOWN 10MAG CH2 INV DELT REF DELT MENU UP CUR MODE MENU SEL OFFSET OUTPUT HOLD
DSP UNIT (X79-1300-00)
R/O REG R/O BLK R/O UBL GND R/O-X GND SGL-RST SGL SINGLE
GND +5V +5V +12V -12V T-LEVEL
CN528
CN524
PANEL UNIT (X66-1470-00 C/4)
CN529
OPD0 OPD2 OPD4 OPD6 OPA0 OPA2 WR INT RxD CTS OP1 ACCHG Ø GND
OPD1 OPD3 OPD5 OPD7 OPA1 CS RD RESET TxD RTS GND OP2 ACCGR +5V NC

# DCS-7040 SCHEMATIC DIAGRAM


PANEL UNIT
(X66-1470-00 B/4)
W517
ED1
(150VTM31A)
(ROT COIL)
X-
X+
Y-
Y+
P2
P1
G2
G1
K
H
FINAL UNIT
CRT SOCKET
(X80-1370-04 C/4)
P1
G1
K
H
H
P2
G2
Y- Y+
X- X+
CN511
PANEL UNIT
(X66-1470-00 D/4)
POWER
FINAL UNIT
AC SELECTOR
(X80-1370-04 B/4)
P22
P21
L
E
N
AC INPUT
F1
FUSE
100, 120V T1.0A
220, 230V T400mA
230V
220V
120V
100V
COM
TRANSFORMER
CN508
173V
NC
173V
NC
69V
NC
69V
NC
15.5V
15.5V
7.7V
7.7V
GND
W5
W7
CN18
CN5
Y-
NC
Y+
CN105
Y-
C.V.
Y+
FINAL UNIT
(X80-1370-04 A/4)
CN4
Y+
GND
Y-
CN14
W14
GND
T.SEP
R/O REG
GND
R/O-Y
-12V
+12V
NC
+55V
CN517
A/B INT
FOCUS
R/O INT
-12V
+12V
GND
-15.5V
+15.5V
ROT
CN20
GND
ROT
ANODE
W511
+5V
GND
+5V
CONT.
7.7V
7.7V
CN7
X-
G2
P2
X+
W18
H
H
K
G1
NC
P1
VERTICAL AMP UNIT
(X73-2120-00 F/6)
CH1 or Y INPUT
CH2 or X INPUT
EXT TRIG INPUT
GND
J1
J2
J3
R101
22
1/4W
R201
22
1/4W
W401
W301
CH1 SIG
GND
CH1 PB
CH2 PB
CH2 SIG
GND
EXT TRIG SIG
GND
W4
Y+
GND
Y-
W506
GND
TRIG.
CN506
+5Va
CH1 OUT
CN13
CN509
W509
GND
+5V
+12V
-12V
V.CLK
T.LINE
REAL/STO
W510
CN510
BSD3
BSD2
BSD1
BSD0
-8V
ASD3
ASD2
ASD1
ASD0
B TRIG'D
MAG
XY
PRE AMP UNIT
(X73-2120-00 A/6)
SWEEP UNIT
(X74-1590-00)
CN525
H-LCK
H-SCK
H-SDATA
CH1PB
CH2PB
CH1ATT
CH2ATT
UNCAL
CN531
1AD-
GND
GND
1AD+
CN532
2AD-
GND
GND
2AD+
CN502
CN512
W512
TRIG.SOURCE
CH2 POSI
CH1 POSI
CH2 INV
W515
H.DISP
S.MODE
CHOP
SLOPE
HDTV
T.CPL
CN515
CN516
CN527
W528
W19
EXT.Z
GND
CN19
FINAL UNIT
BNC CONNECTOR
(X80-1370-04 D/4)
EXT.Z INPUT
W13
CH1 OUT 50mV/DIV
W516
GND
+5V
TRIG'D
+12V
-12V
DTP
HOLD-OFF
T.LEVEL
H.POSI
READY
PANEL UNIT
(X66-1470-00 A/4)
CN525
H-LCK
H-SCK
H-SDATA
CH1PB
CH2PB
CH1ATT
CH2ATT
UNCAL
CN531
1AD-
GND
GND
1AD+
CN532
2AD-
GND
GND
2AD+
CN527
R/O REG
R/O BLK
GND
R/O UBL
R/O-Y
GND
R/O-X
GND
SGL-RST
SGA
SGB
SINGLE
CN528
GND
+5V
+5V
+5V
+12V
-12V
T-SEP
T-LEVEL
CN502
CN523
CN523
+4VREF
SGLRDY
SWP UP
WLED
B TRG'D
DTP
MENU DOWN
MENU SET
V.MODE
DISPLAY
OFFSET
SAVE
STR/REAL
H.MODE
SWP DOWN
10MAG
CH2 INV
DELT REF
DELT
MENU UP
CUR MODE
MENU SEL
OUTPUT
HOLD
DSP UNIT
(X79-1300-01)
CN524
CN524
PANEL UNIT
(X66-1470-00 C/4)
CN529
OPD0
OPD2
OPD4
OPD6
OPA0
OPA2
WR
INT
RxD
CTS
+5V
OP1
ACCRQ
Ø
GND
OPD1
OPD3
OPD5
OPD7
OPA1
CS
RD
RESET
TxD
RTS
GND
OP2
ACCGR
+5V
NC

# SCHEMATIC DIAGRAM

## PANEL UNIT (X66-1470-00)


PANEL UNIT (X66-1470-00 A/4)
(X66-1470-00 B/4)
(X66-1470-00 C/4)
(X66-1470-00 D/4)
W523 (23P)
W512 (4P)
W515 (6P)
W516 (10P)
W517 (9P)
CN524 (30P)
CN529 (30P)
CN511 (6P)
STO/REAL
SAVE
DISPLAY OFFSET
VMODE
MENUSET
MENUDOWN
DTP
BTRIGD
WLED
SWPUP
SGLRDY
+4VREF
HOLD
OUTPUT
MENUSEL
CURMODE
MENUUP
DELT
DELTREF
CH2INV
10MAG
SWPDOWN
HMODE
CH2 INV
CH1 POSI
CH2 POSI
TRIG SOURCE
DISPLAY OFFSET
SWEEP
SEL
MENU
OFF
REF
PEAK
PRCS
INTP
TIME
REAL/STORAGE
HOLD
SAVE
OUTPUT
MENUSET
CH2 INV
WRITE
CH1 POSITION
CH2 POSITION
CURSOR MODE
TRIG SOURCE
V MODE
CH1
CH2
LINE
EXT
TRIG COUPL.
AC
HF
DC
TV V
TV H
SWEEP MODE
AUTO
NORM
FIX
SINGLE
RESET
HORIZ MODE
A
ALT
B
X-Y
V MODE
CH1
ALT
CHOP
ADD
CH2
SLOPE
×10MAG
HDTV
TRIG.LEVEL
POSITION
B TRIG'D
READY
TRIG'D
HOLD OFF
DTP Fine
REF DTP
IC1a
IC1b
T.CPL
HDTV
SLOPE
CHOP
S.MODE
H.DISP
READY
H.POSI
T.LEVEL
HOLD-OFF
DTP
-12V
+12V
TRIG'D
+5V
GND
OPD0
OPD2
OPD4
OPD6
OPA0
OPA2
WR
INT
RXD
CTS
+5V
OP1
ACCRQ
Ø
GND
OPD1
OPD3
OPD5
OPD7
OPA1
CS
RD
RESET
TXD
RTS
GND
OP2
ACCGR
+5V
NC
R420 18 2W
R421 18 2W
Q407
Q408
D404
+5V
GND
+5V
CONT.
7.7V
7.7V
A/B INTEN
FOCUS
R/O INTEN
TRACE ROTATION
A/B INT
FOCUS
R/O INT
-12V
+12V
GND
-15.5V
+15.5V
ROT
POWER
D103
IC101a
IC101b
ILLUM
Q101
Q102
Q103
Q104
PL101
PL102
PL103
D101
D102
CAL

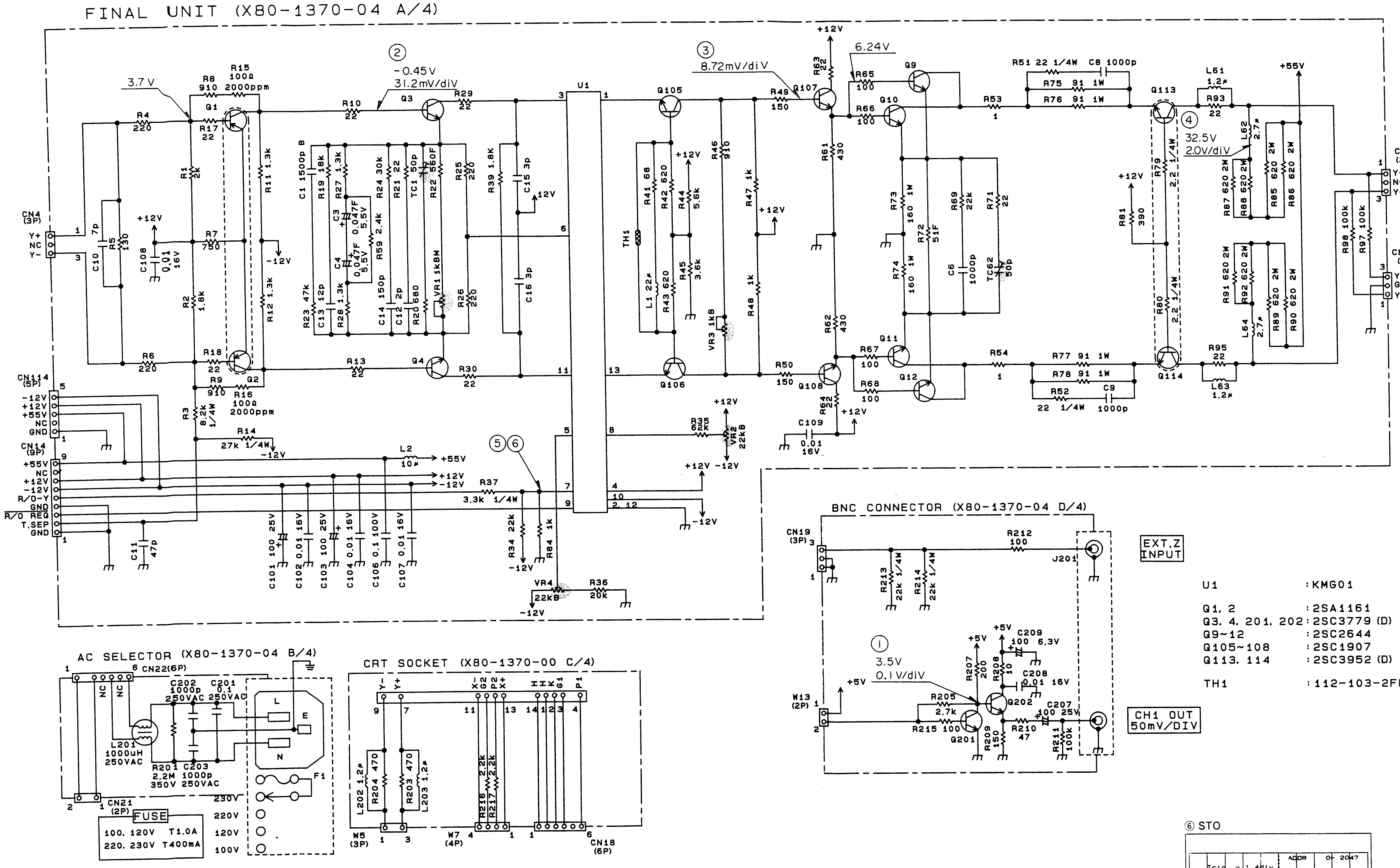
IC1, 101 : MJMM4558L

Q1, 101, 102 : 2SC1740S (R, S)
Q2, 408 : 2SA933S (R, S)
Q103 : 2SC1318A (R)
Q104 : 2SA720A (R)
Q407 : 2SB1015 (Y)

D1 : LN222RP
D2, 3 : LN322GP
D101, 102 : 1SS132
D404 : D3SB20

# SCHEMATIC DIAGRAM

## FINAL UNIT (X80-1370-00)


FINAL UNIT (X80-1370-04 A/4)
3.7V
② -0.45V 31.2mV/diV
③ 8.72mV/diV
6.24V
④ 32.5V 2.0V/diV
⑤⑥
+12V
+55V
-12V
CN4 (3P) Y+ NC Y-
CN114 (5P) -12V +12V +55V NC GND
CN14 (9P) +55V NC +12V -12V R/O-Y GND R/O REG T.SEP GND
CN5 (3P) Y- NC Y+
CN105 (3P) Y- GND Y+
U1
Q1 Q2 Q3 Q4 Q9 Q10 Q11 Q12 Q105 Q106 Q107 Q108 Q113 Q114
R15 100Ω
R8 910 2000ppm
R16 100Ω 2000ppm
R9 910
R14 27k 1/4W
R3 8.2k 1/4W
R37 3.3k 1/4W
L2 10μ
VR1 1k8M
VR2 22k8
VR3 1k8
VR4 22k8
R36 20K
TH1
R51 22 1/4W C8 1000p
R75 91 1W
R76 91 1W
R77 91 1W
R78 91 1W
R52 22 1/4W C9 1000p
L61 1.2μ
L62 2.7μ
L63 1.2μ
L64 2.7μ
C109 0.01 16V
C101 100 25V
C102 0.01 16V
C103 100 25V
C104 0.01 16V
C105 0.1 100V
C106 0.1 100V
C107 0.01 16V
BNC CONNECTOR (X80-1370-04 D/4)
CN19 (3P)
R212 100
J201
EXT.Z INPUT
R213 22k 1/4W
R214 22k 1/4W
① 3.5V 0.1V/diV
+5V
C209 100 6.3V
C208 0.01 16V
C207 100 25V
R205 2.7k
R215 100
R207 200
R208 10
R209 150
R210 47
R211 100k
Q201 Q202
W13 (2P)
CH1 OUT 50mV/DIV
AC SELECTOR (X80-1370-04 B/4)
CN22(6P)
C202 1000p 250VAC
C201 0.1 250VAC
L201 1000uH 250VAC
R201 2.2M 350V
C203 1000p 250VAC
CN21 (2P)
L E N
F1
230V 220V 120V 100V
FUSE
100, 120V T1.0A
220, 230V T400mA
CRT SOCKET (X80-1370-00 C/4)
L202 1.2μ
R204 470
R203 470
L203 1.2μ
R216 2.2k
R217 2.2k
W5 (3P)
W7 (4P)
CN18 (6P)

U1 :KMG01

Q1, 2 :2SA1161

Q3, 4, 201, 202 :2SC3779 (D)

Q9~12 :2SC2644

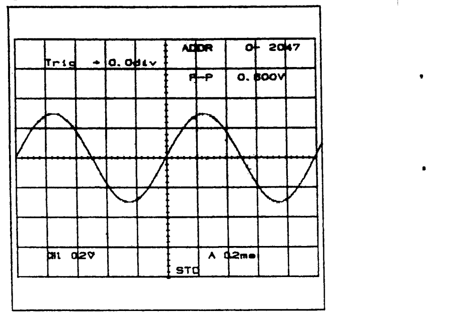
Q105~108 :2SC1907

Q113, 114 :2SC3952 (D)

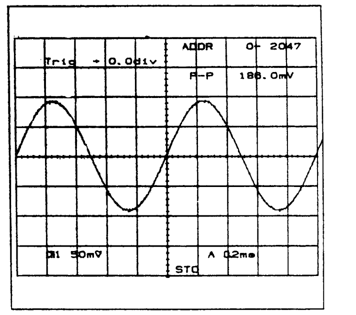
TH1 :112-103-2FM

①~④
5mV/div
1kHz 6div

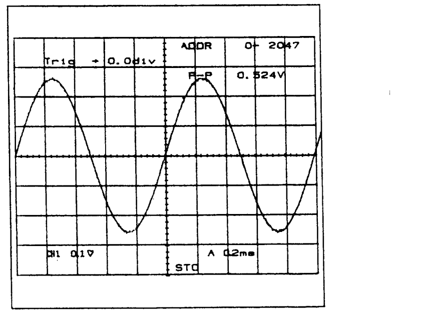
①



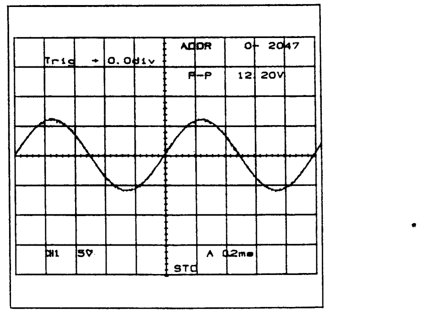
②



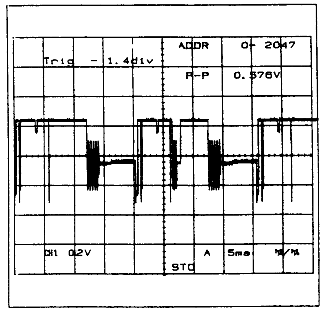
③



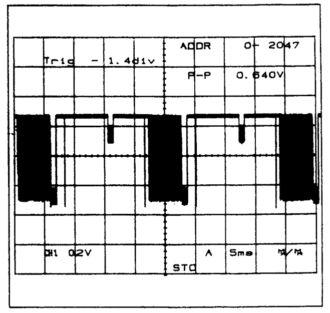
④



⑥ STO

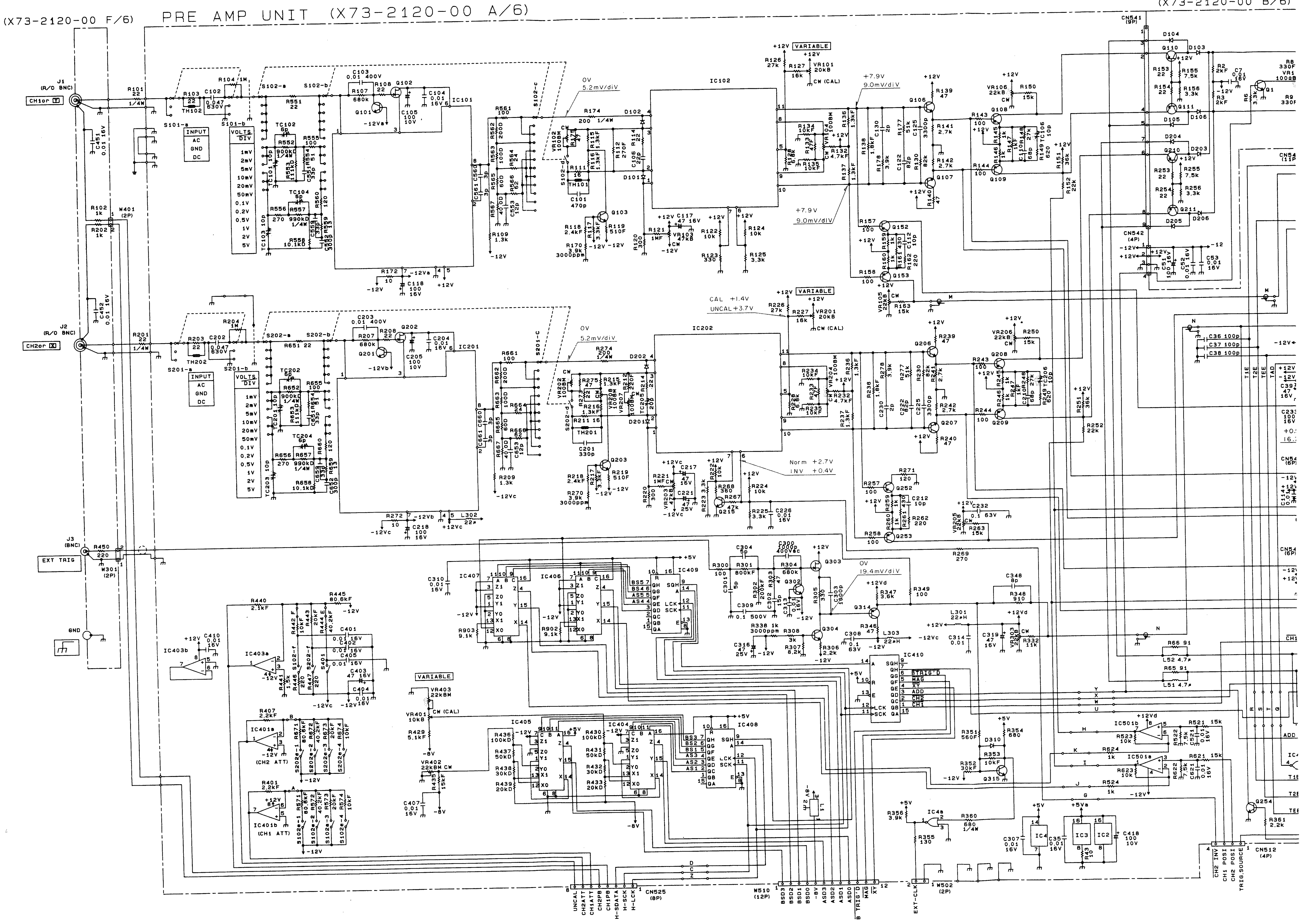


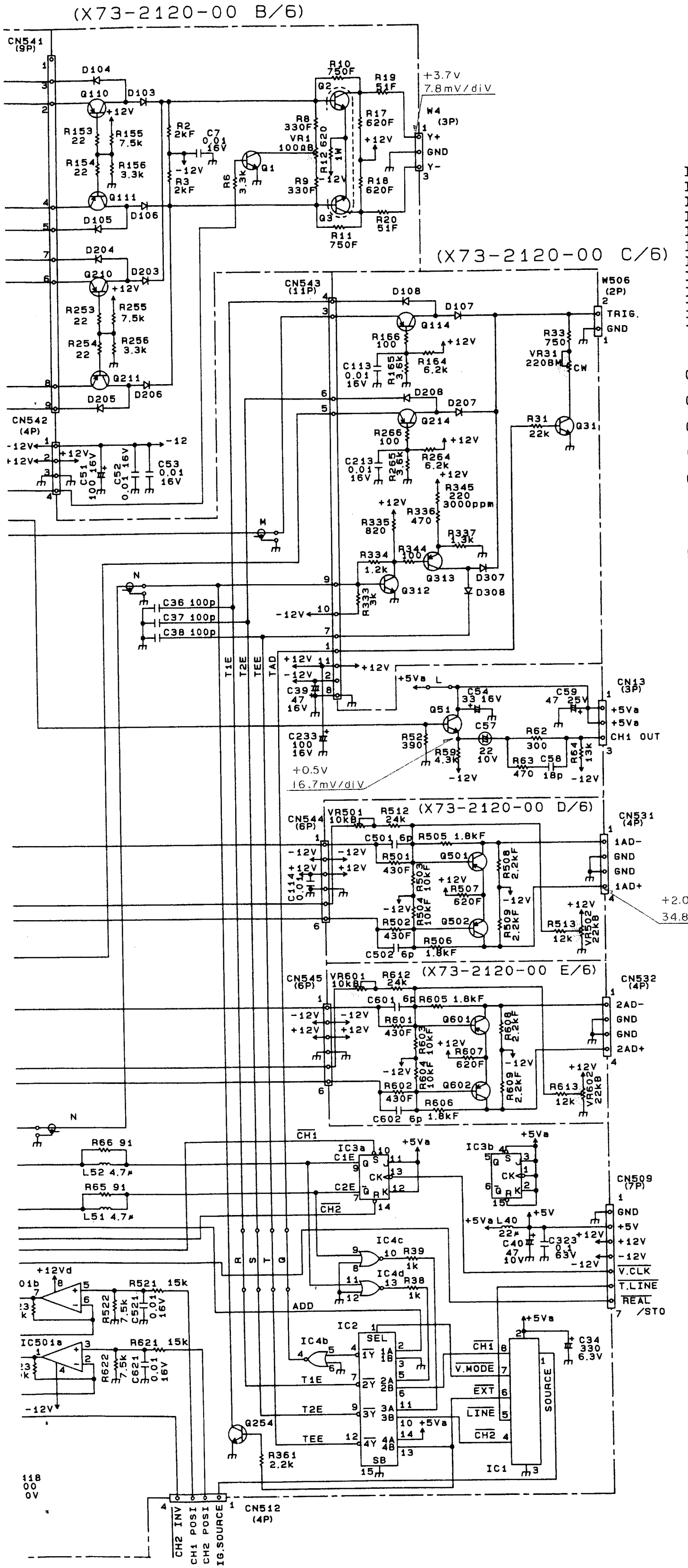
⑤ REAL



# SCHEMATIC DIAGRAM

## PRE AMP UNIT (X73-2120-00)


(X73-2120-00 F/6)
PRE AMP UNIT (X73-2120-00 A/6)
(X73-2120-00 B/6)
J1 (R/O BNC)
CH1or Y
J2 (R/O BNC)
CH2or X
J3 (BNC)
EXT TRIG
GND
INPUT
AC
GND
DC
VOLTS DIV
1mV
2mV
5mV
10mV
20mV
50mV
0.1V
0.2V
0.5V
1V
2V
5V
IC101
IC102
IC201
IC202
IC401a
IC401b
IC403a
IC403b
IC404
IC405
IC406
IC407
IC408
IC409
IC410
IC501a
IC501b
VARIABLE
CW (CAL)
CAL +1.4V
UNCAL +3.7V
Norm +2.7V
INV +0.4V
0V
5.2mV/diV
+7.9V
9.0mV/diV
19.4mV/diV
(CH2 ATT)
(CH1 ATT)
CN525 (8P)
UNCAL
CH2ATT
CH1ATT
CH2PB
CH1PB
H-SDATA
H-SCK
H-LCK
W510 (12P)
BSD3
BSD2
BSD1
BSD0
-8V
ASD3
ASD2
ASD1
ASD0
B TRIG'D
MAG
XY
W502 (2P)
EXT-CLK
CN512 (4P)
CH2 INV
CH1 POSI
CH2 POSI
TRIG.SOURCE
CN541 (9P)
CN542 (4P)
W401 (2P)
W301 (2P)


(X73-2120-00 B/6)
(X73-2120-00 C/6)
(X73-2120-00 D/6)
(X73-2120-00 E/6)
CN541 (9P)
CN542 (4P)
CN543 (11P)
CN544 (6P)
CN545 (6P)
CN13 (3P)
CN531 (4P)
CN532 (4P)
CN509 (7P)
CN512 (4P)
W4 (3P)
W506 (2P)
+3.7V
7.8mV/diV
+0.5V
16.7mV/diV
+2.0V
34.8mV/diV
Y+
GND
Y-
TRIG.
GND
+5Va
+5Va
CH1 OUT
1AD-
GND
GND
1AD+
2AD-
GND
GND
2AD+
GND
+5V
+12V
-12V
V.CLK
T.LINE
REAL
/STO
SOURCE
IC1
IC2
IC3a
IC3b
IC4b
IC4c
IC4d
Q254
CH2 INV
CH1 POSI
CH2 POSI
TRIG.SOURCE

| | |
|---|---|
| IC1 | :KMS01 |
| IC2 | :SN74LS158N |
| IC3 | :SN74LS112AN |
| IC4 | :SN74LS02N |
| IC101, 102 | :KMC13 |
| IC102, 202 | :KMC14 |
| IC401 | :NJM072L |
| IC403 | :NJM4558L |
| IC404~407 | :TC4053BF |
| IC408~410 | :TC74HC595AF |
| IC501 | :NJM4558D |

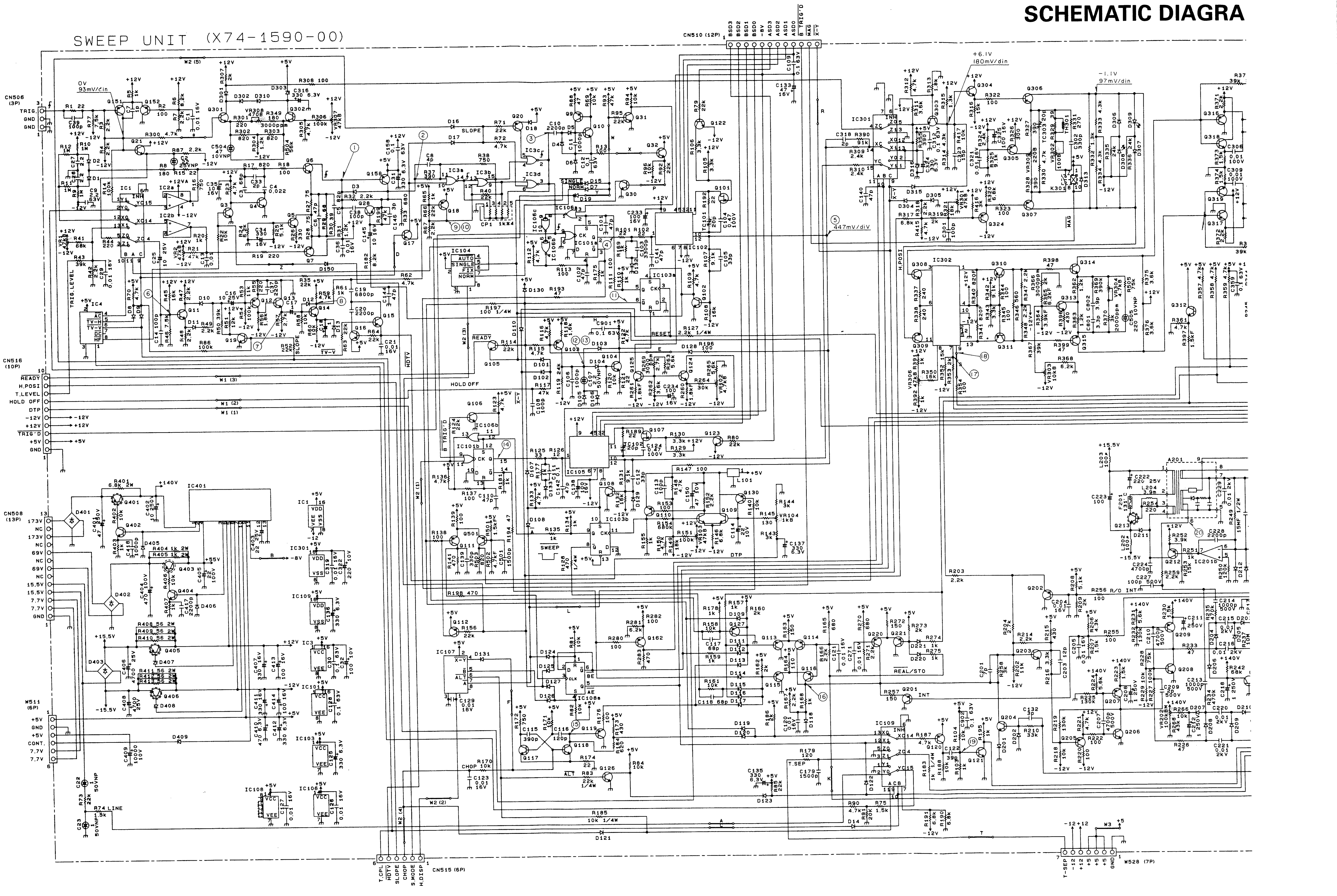
| | |
|---|---|
| Q1, 31, 215, 254 | :2SC1740S (R, S) |
| Q2, 3, 106, 107, 206, 207 | :2SC3779 (D) |
| Q51, 101, 103, 201, 203, 302, 304 312, 315 | :2SC1923 (O) |
| Q102, 202, 303 | :2SK404 (E) |
| Q108~111, 114, 152, 153, 208~211 214, 252, 253, 313, 314, 501, 502 601, 602 | :2SA1005 (K) |

| | |
|---|---|
| D101~108, 201~208, 307, 308, 310 | :1SS132 |

| | |
|---|---|
| TH101, 201 | :112-102-2 |
| TH102, 202 | :112-201-2FM |

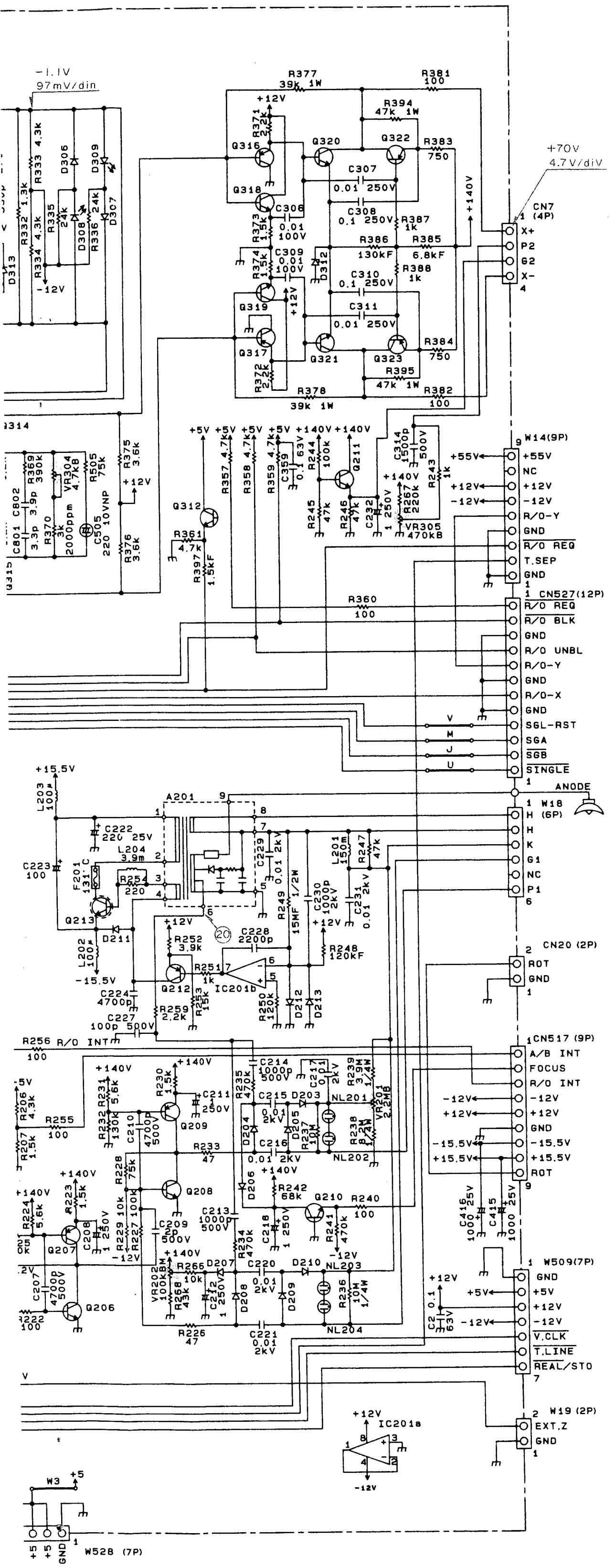
# SCHEMATIC DIAGRA

## SWEEP UNIT (X74-1590-00)



SWEEP UNIT (X74-1590-00)
CN506 (3P)
TRIG.
GND
GND
CN516 (10P)
READY
H.POSI
T.LEVEL
HOLD OFF
DTP
-12V
+12V
TRIG'D
+5V
GND
CN508 (13P)
173V
NC
173V
NC
69V
NC
69V
15.5V
15.5V
7.7V
7.7V
GND
W511 (6P)
+5V
GND
+5V
CONT.
7.7V
7.7V
CN510 (12P)
BSD3
BSD2
BSD1
BSD0
+8V
ASD3
ASD2
ASD1
ASD0
B TRIG'D
MAG
X-Y
CN515 (6P)
T.CPL
HDTV
SLOPE
CHOP
S.MODE
H.DISP
W528 (7P)
T-SEP
-12
+12
+5
+5
GND
IC401
SLOPE
HOLD OFF
SINGLE
NORM
AUTO
FIX
SWEEP
DTP
REAL/STO
INT
CHOP
ALT
T.SEP
LINE
TRIG.LEVEL
+6.1V
180mV/div
-1.1V
97mV/div
447mV/div
0V
93mV/div

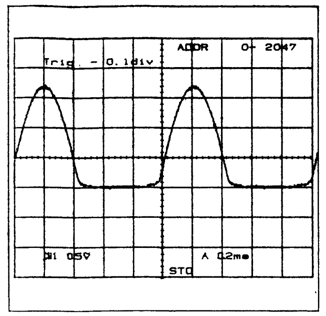
# EMATIC DIAGRAM



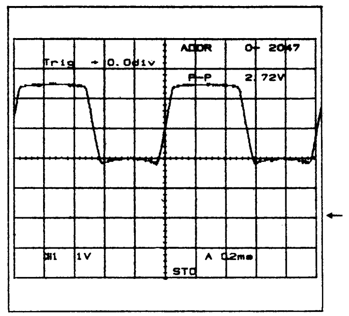
-1.1V
97mV/div
+70V
4.7V/div
R377 39k 1W
R381 100
R394 47k 1W
R383 750
Q316
Q318
Q320
Q322
Q319
Q317
Q321
Q323
C307 0.01 250V
C308 0.1 250V
C309 0.01 100V
C310 0.1 250V
C311 0.01 250V
R386 130kF
R385 6.8kF
R388 1k
R384 750
R395 47k 1W
R378 39k 1W
R382 100
+140V
CN7 (4P)
X+
P2
G2
X-
W14(9P)
+55V
NC
+12V
-12V
R/O-Y
GND
R/O REQ
T.SEP
GND
CN527(12P)
R/O REQ
R/O BLK
GND
R/O UNBL
R/O-Y
GND
R/O-X
GND
SGL-RST
SGA
SGB
SINGLE
R360 100
VR305 470kB
Q312
Q211
ANODE
W18 (6P)
H
H
K
G1
NC
P1
A201
Q213
IC201b
CN20 (2P)
ROT
GND
CN517 (9P)
A/B INT
FOCUS
R/O INT
-12V
+12V
GND
-15.5V
+15.5V
ROT
Q206
Q207
Q208
Q209
Q210
NL201
NL202
NL204
W509(7P)
GND
+5V
+12V
-12V
V.CLK
T.LINE
REAL/STO
W19 (2P)
EXT.Z
GND
IC201a
W3
W528 (7P)

|  |  |
|---|---|
| IC1 | :TC4053BP |
| IC2 | :NJM072BD |
| IC3 | :MC10102L |
| IC4, 104, 107 | :KMS01 |
| IC101 | :MC10131L |
| IC102, 105 | :KMD05 |
| IC103, 108 | :SN74ALS74AN |
| IC106 | :SN74ALS02N |
| IC109, 301 | :TC74HC4053AP |
| IC201 | :NJM4558D |
| IC302 | :KMG01 |
| IC401 | :KMA02 |
| Q3, 10, 11, 13, 14, 19, 30~32 104~106, 122~126, 204, 301~304 308, 309, 312, 313 | :2SC1740S (R, S) |
| Q4, 5, 102, 108, 117, 118, 121, 203 | :2SC1923 (O) |
| Q6, 7 | :2SC3779 (D) |
| Q9, 28, 110, 120, 151, 152, 158 316, 317 | :2SA1459 (K) |
| Q12, 15, 16, 113~116, 127, 220 221, 306, 307 | :2SA1005 (K) |
| Q17, 18, 20, 103, 111, 112, 119 130, 162, 201, 202, 205, 212 305, 310, 311, 324, 501 | :2SA933S (R, S) |
| Q21, 314, 315, 318, 319 | :2SC1907 |
| Q101, 107 | :2SK170 (V) |
| Q109 | :2SC3381 (GR) |
| Q206, 208 | :2SC2910 (S) |
| Q207, 209 | :2SA1208 (S) |
| Q210, 211, 402, 404 | :2SC2551 (O) |
| Q213 | :2SD613 (E) |
| Q320, 321 | :2SC4732 (E) |
| Q322, 323 | :2SA1828 (E) |
| Q401 | :2SA1499 (O, P) |
| Q403 | :2SA1304 |
| Q405 | :2SB1015 (Y) |
| Q406 | :2SD1406 (Y) |
| D1~5, 12, 15, 109, 114, 130, 132 133, 150, 301, 306, 307 | :MA700 |
| D6~11, 13, 14, 16~19, 101~108 110~113, 115~129, 131, 201, 202 211~213, 220, 221, 302, 304, 305 310, 313, 315, 405, 406 | :1SS132 |
| D203~210 | :1SS83 |
| D303, 316 | :MTZ3.0JA |
| D308, 309 | :TLR112 |
| D312 | :MTZ5.1JB |
| D401, 402 | :S1VB60 |
| D403 | :S4VB20F |
| D407, 408 | :MTZ13JC |
| D409 | :MTZ7.5JA |

1kHz Sine wave, 4div input
10mV/div • 0.2ms/div
① Trig: Center

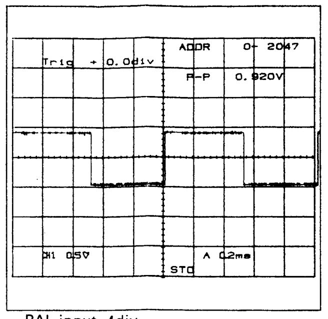


1kHz Sine wave, 4div input
10mV/div • 0.2ms/div
② Trig: Center

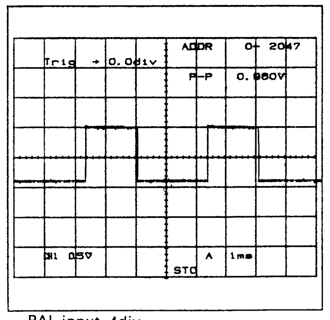


← GND

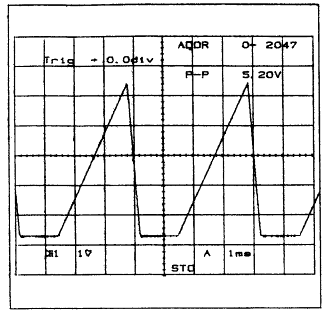
1kHz Sine wave, 4div input
10mV/div • 0.2ms/div
③ Trig: Center



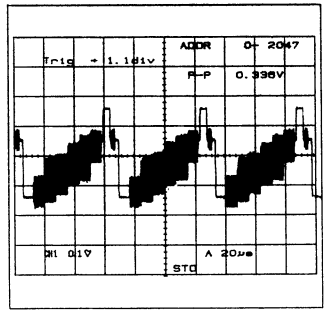
1kHz Sine wave, 4div input
10mV/div • 0.2ms/div
④ Trig: Center



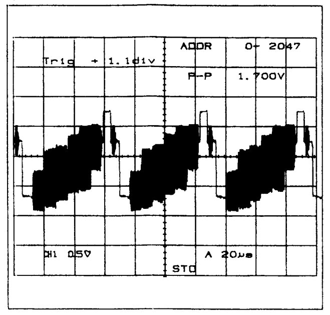
PAL input, 4div
⑤ COLOR BAR



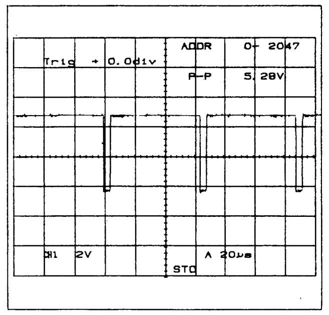
PAL input, 4div
⑥ COLOR BAR



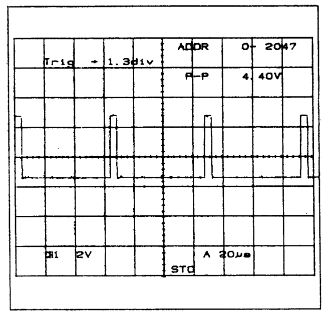
PAL input, 4div
⑦ COLOR BAR



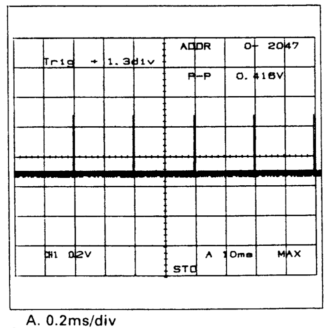
PAL input, 4div
⑧ COLOR BAR



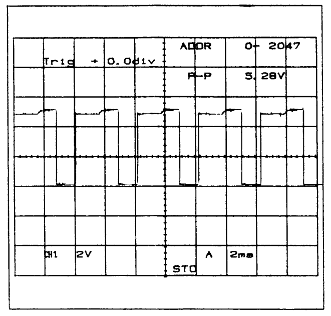
⑨ PAL



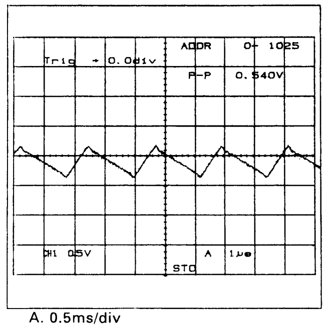
⑩ PAL



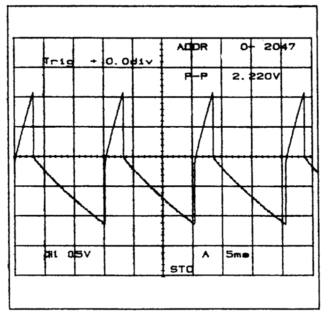
⑪ 1kHz Sine wave



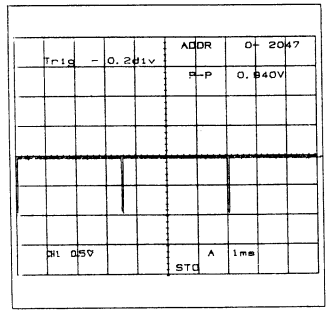
⑫ 0.1μs/div



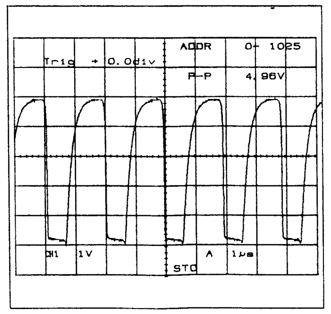
⑬ 1ms/div



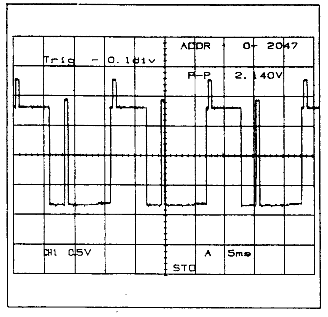
A. 0.2ms/div
⑭ B. 5μs/div



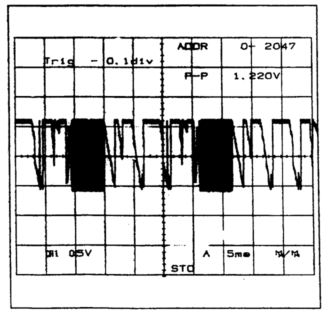
⑮ CHOP



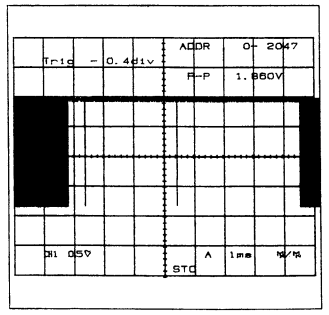
A. 0.5ms/div
⑯ B. 50μs/div ALT



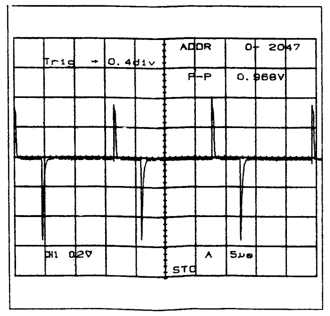
⑰ REAL



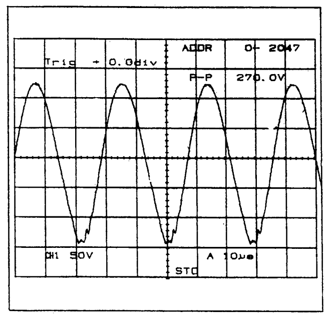
⑱ REAL



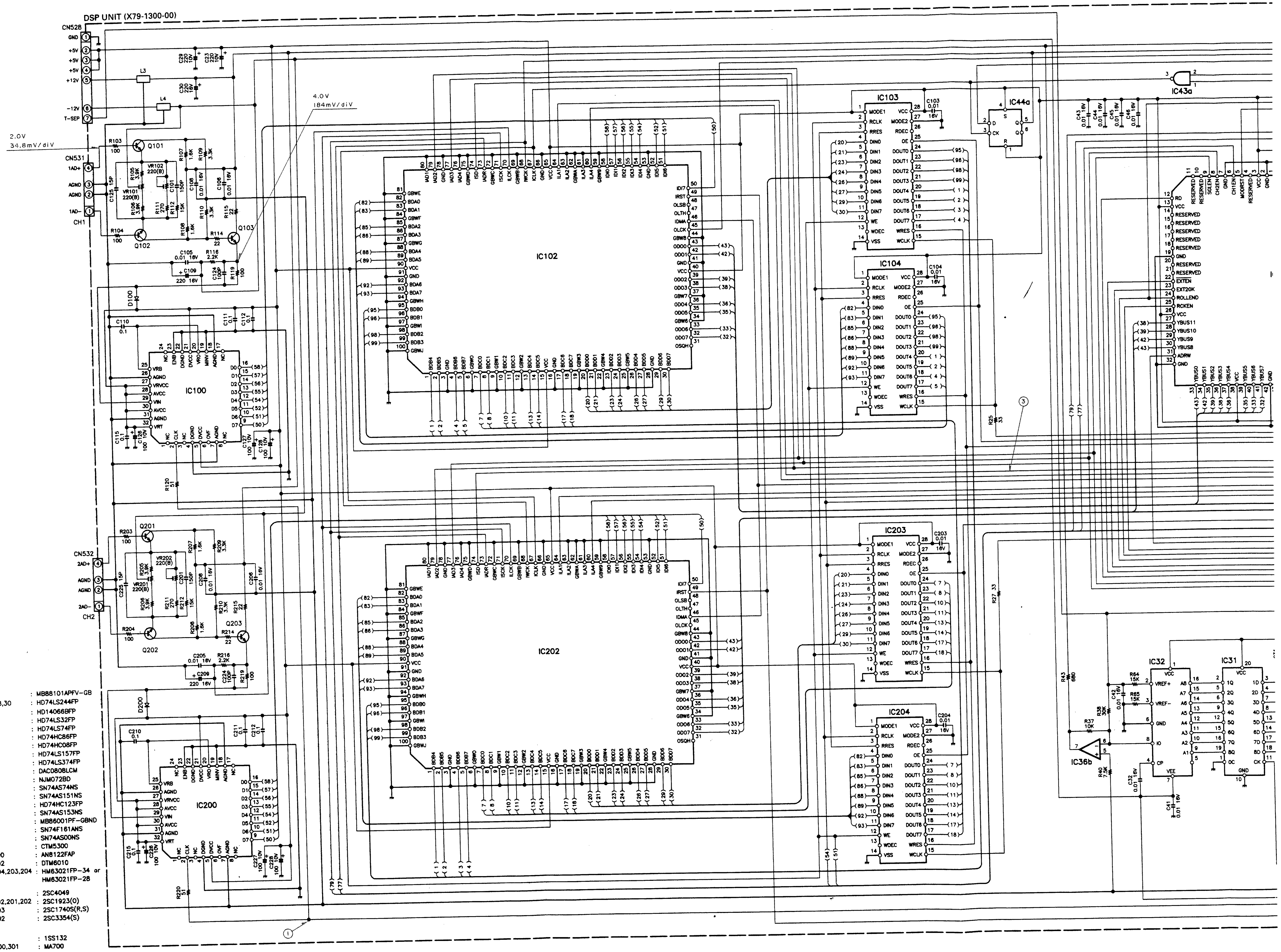
⑲ 1μs/div



⑳



## DSP UNIT (X79-1300-00)

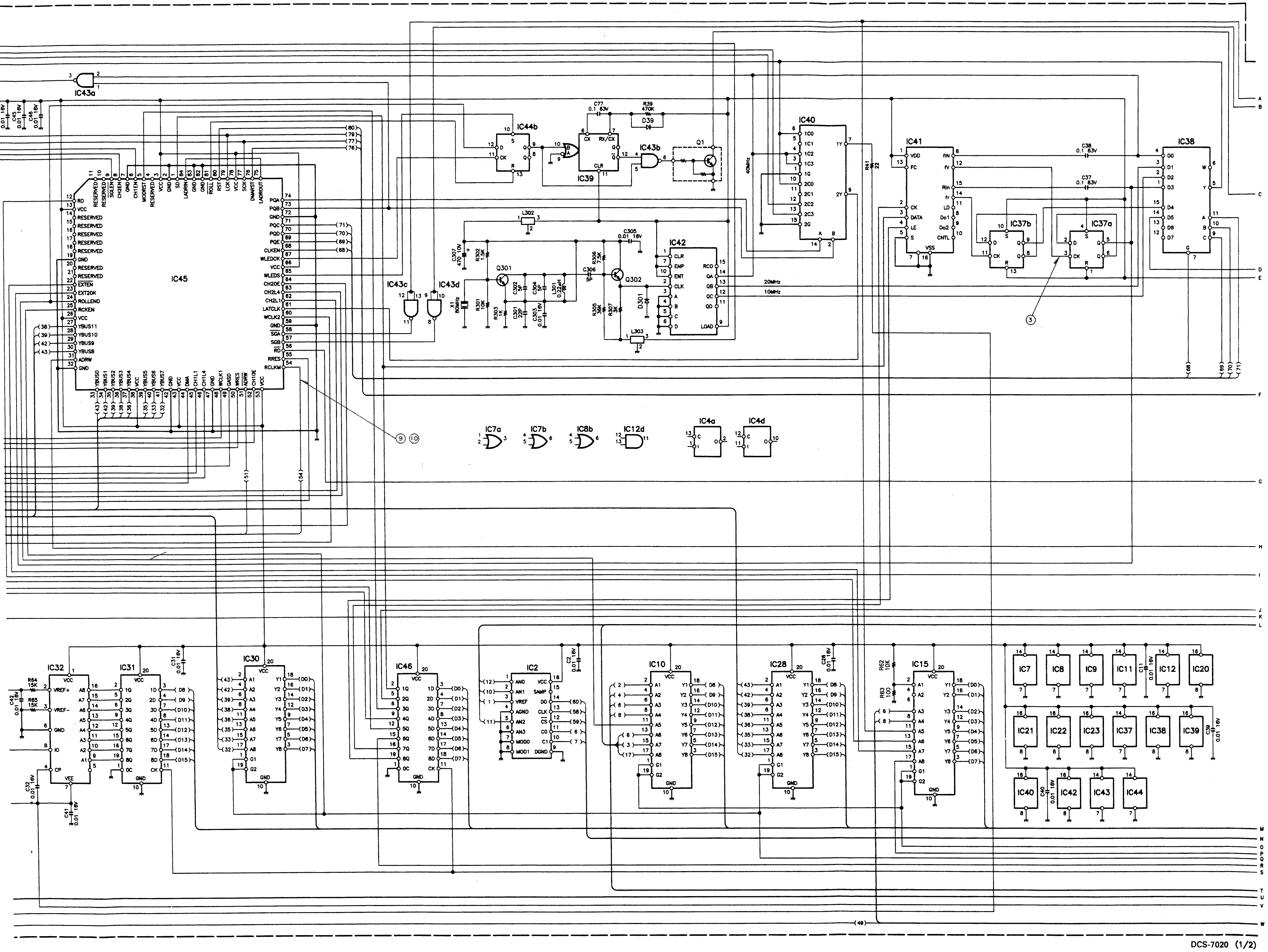

DSP UNIT (X79-1300-00)
CN528
GND
+5V
+12V
-12V
T-SEP
CN531
1AD+
AGND
1AD-
CH1
CN532
2AD+
AGND
2AD-
CH2
2.0V
34.8mV/div
4.0V
184mV/div
Q101
Q102
Q103
Q201
Q202
Q203
IC100
IC200
IC102
IC202
IC103
IC104
IC203
IC204
IC43a
IC44a
IC32
IC31
IC36b
D100
D200
L3
L4

IC2 : MB88101APFV-GB
IC10,15,28,30 : HD74LS244FP
IC4 : HD14066BFP
IC7,8 : HD74LS32FP
IC9 : HD74LS74FP
IC11 : HD74HC86FP
IC12 : HD74HC08FP
IC20~23 : HD74LS157FP
IC31,46 : HD74LS374FP
IC32 : DAC0808LCM
IC36 : NJM072BD
IC37,44 : SN74AS74NS
IC38 : SN74AS151NS
IC39 : HD74HC123FP
IC40 : SN74AS153NS
IC41 : MB86001PF-GBND
IC42 : SN74F161ANS
IC43 : SN74AS00NS
IC45 : CTM5300
IC100,200 : AN8122FAP
IC102,202 : DTM6010
IC103,104,203,204 : HM63021FP-34 or HM63021FP-28

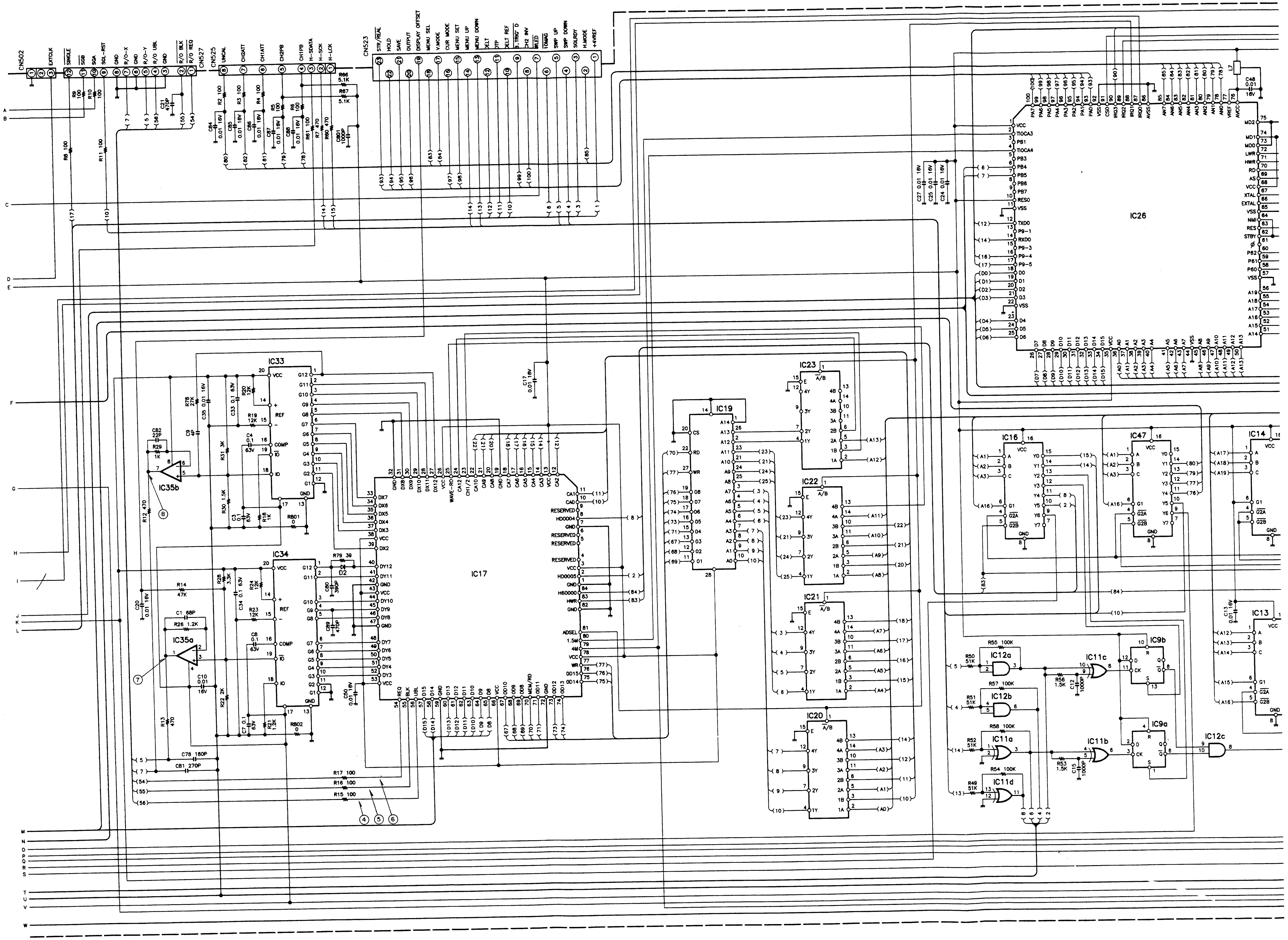
Q1 : 2SC4049
Q101,102,201,202 : 2SC1923(O)
Q103,203 : 2SC1740S(R,S)
Q301,302 : 2SC3354(S)

D39 : 1SS132
D100,200,301 : MA700

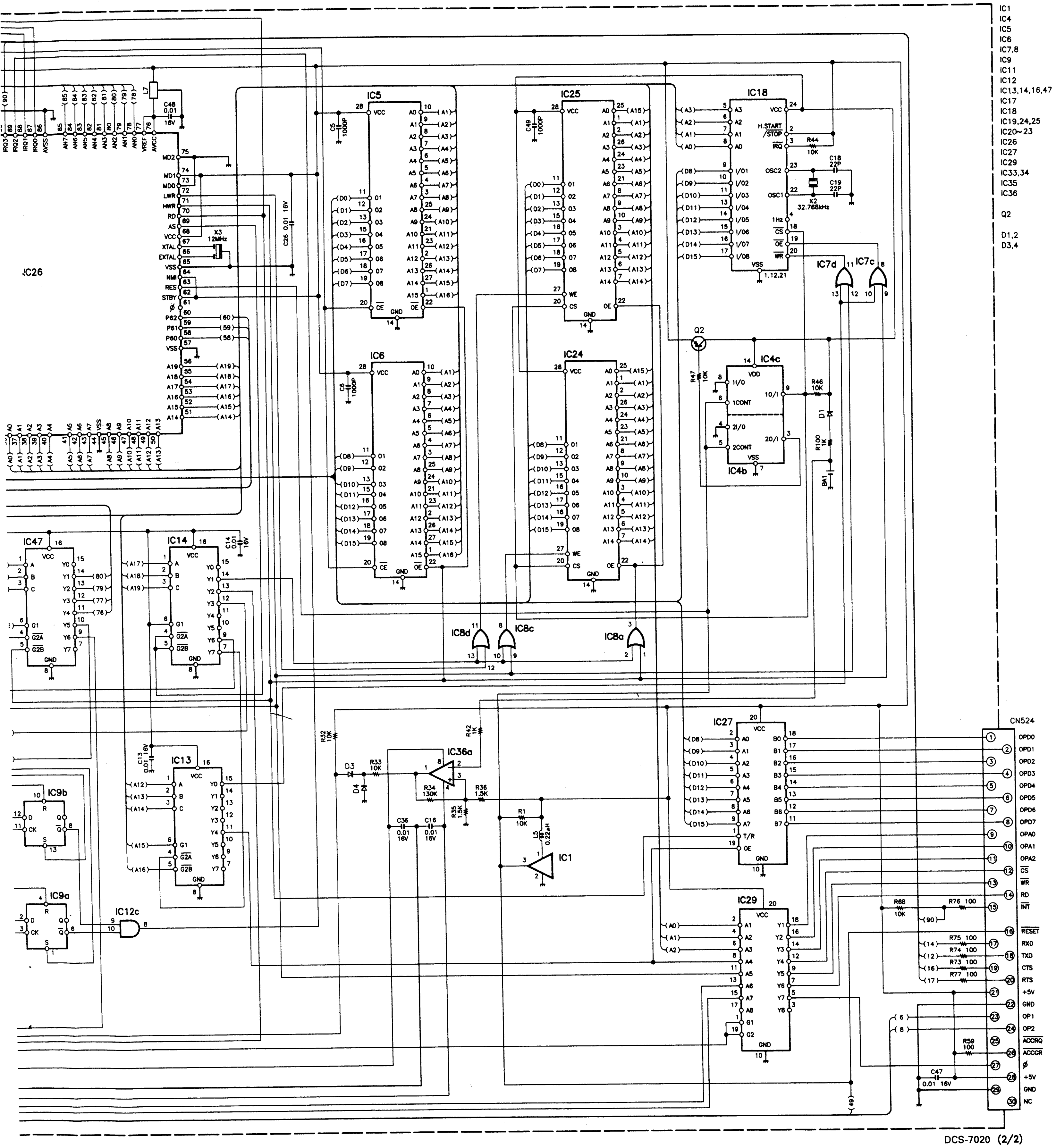
# 020 SCHEMATIC DIAGRAM


IC43a
IC44b
IC39
IC43b
Q1
IC40
IC41
IC38
C77 0.1 63V
R39 470K
D39
IC45
IC42
IC43c
IC43d
Q301
Q302
L302
L303
C305 0.01 16V
C306 5P
D301
X1
C38 0.1 63V
C37 0.1 63V
IC37b
IC37a
R41 22
40MHz
20MHz
10MHz
IC7a
IC7b
IC8b
IC12d
IC4a
IC4d
IC32
IC31
IC30
IC46
IC2
IC10
IC28
IC15
R64 15K
R65 15K
R62 10K
R63 100
IC7
IC8
IC9
IC11
IC12
IC20
IC21
IC22
IC23
IC37
IC38
IC39
IC40
IC42
IC43
IC44
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
③
⑨
⑩

## DSP UNIT (X79-1300-00)


CN502
CN527
CN525
CN523
IC33
IC34
IC35a
IC35b
IC17
IC19
IC23
IC22
IC21
IC20
IC26
IC16
IC47
IC14
IC13
IC12a
IC12b
IC12c
IC11a
IC11b
IC11c
IC11d
IC9a
IC9b

# SCHEMATIC DIAGRAM

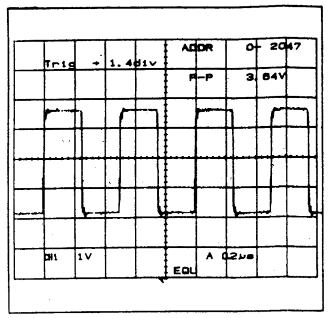


IC26
IC5
IC25
IC18
IC6
IC24
IC4c
IC4b
Q2
IC7d
IC7c
IC8d
IC8c
IC8a
IC47
IC14
IC13
IC9b
IC9a
IC12c
IC27
IC29
IC36a
IC1
CN524
X3 12MHz
X2 32.768kHz
OPD0
OPD1
OPD2
OPD3
OPD4
OPD5
OPD6
OPD7
OPA0
OPA1
OPA2
CS
WR
RD
INT
RESET
RXD
TXD
CTS
RTS
+5V
GND
OP1
OP2
ACCRQ
ACCGR
φ
+5V
GND
NC

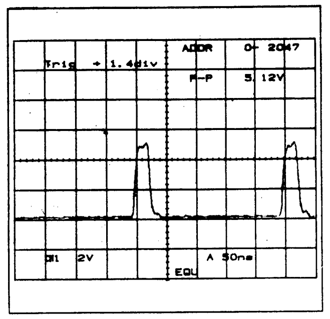
| | | |
|---|---|---|
| IC1 | : | PST7045 |
| IC4 | : | HD14066BFP |
| IC5 | : | T93–0893–05 |
| IC6 | : | T93–0894–05 |
| IC7,8 | : | HD74LS32FP |
| IC9 | : | HD74LS74FP |
| IC11 | : | HD74HC86FP |
| IC12 | : | HD74HC08FP |
| IC13,14,16,47 | : | HD74LS138FP |
| IC17 | : | CTM5290 |
| IC18 | : | HD64610FP |
| IC19,24,25 | : | 62256BLFP7SL |
| IC20~23 | : | HD74LS157FP |
| IC26 | : | HD6433040A00F |
| IC27 | : | HD74HC245FP |
| IC29 | : | HD74HC244FP |
| IC33,34 | : | HA17012PB |
| IC35 | : | μPC814C |
| IC36 | : | NJM072BD |
| Q2 | : | 2SA933S(R,S) |
| D1,2 | : | MA700 |
| D3,4 | : | 1SS132 |

DCS-7020 (2/2)

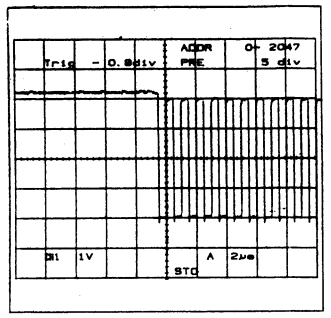
① 0.1ms/div



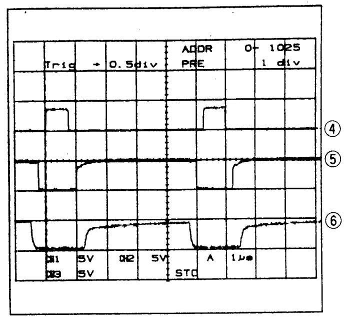
② 0.1ms/div



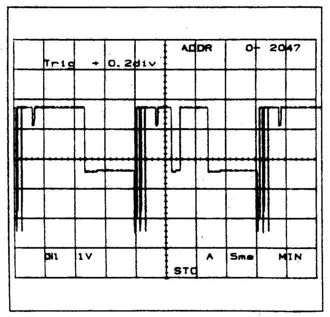
③ STO 0.1ms/div



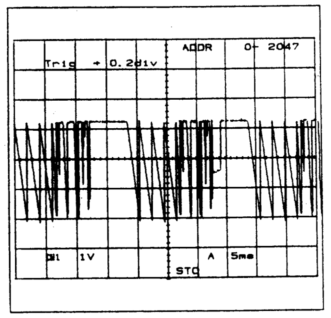
④, ⑤, ⑥ REAL



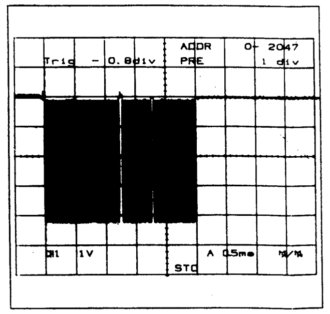
⑦ STO R/O Y



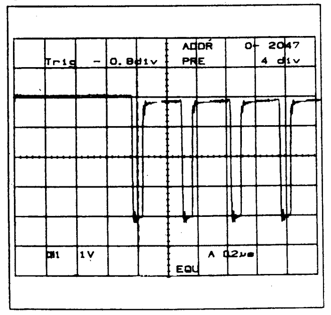
⑧ STO R/O X



⑨

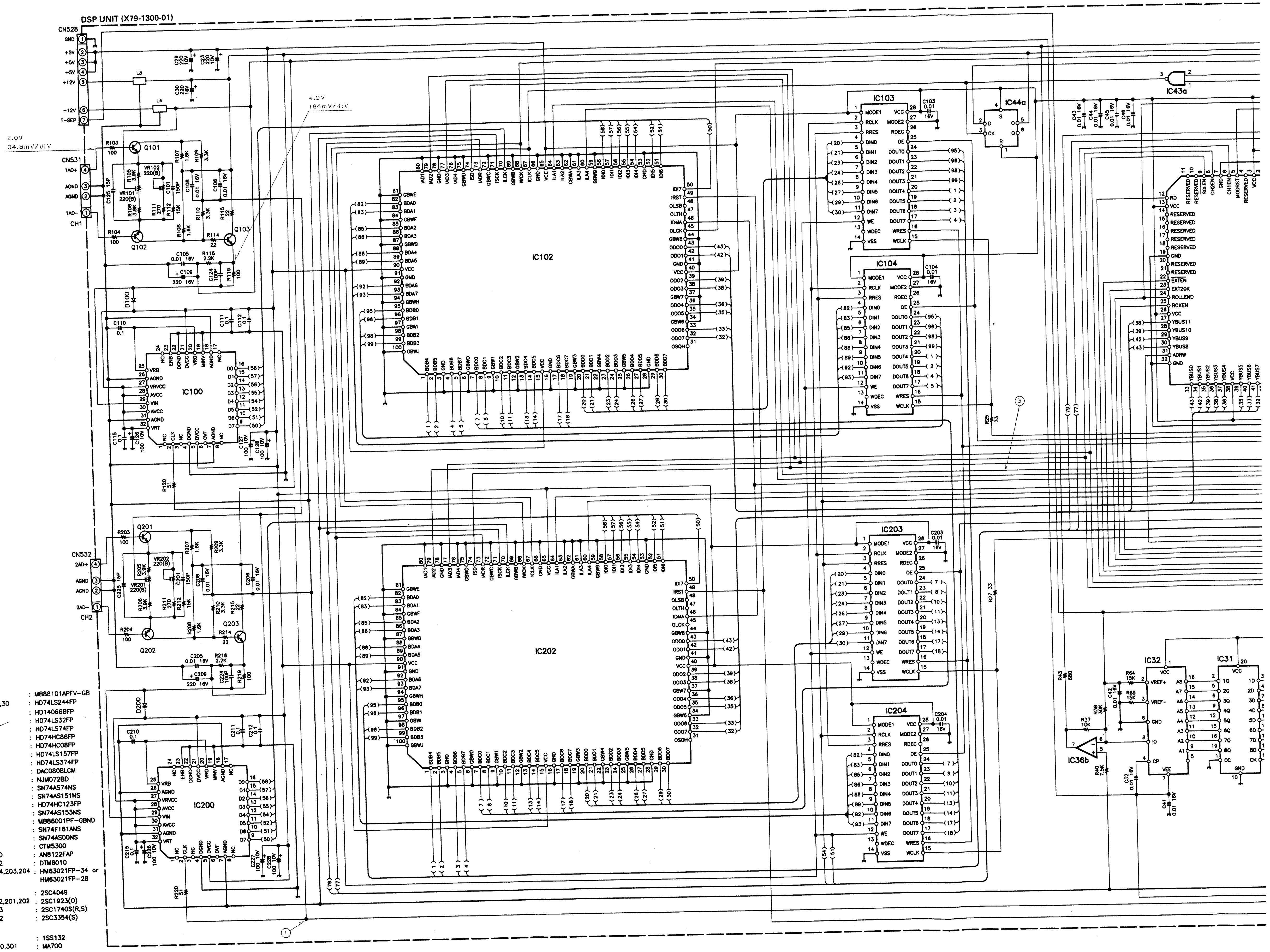


⑩



# DCS-7040 SCHEMATIC

## DSP UNIT (X79-1300-01)

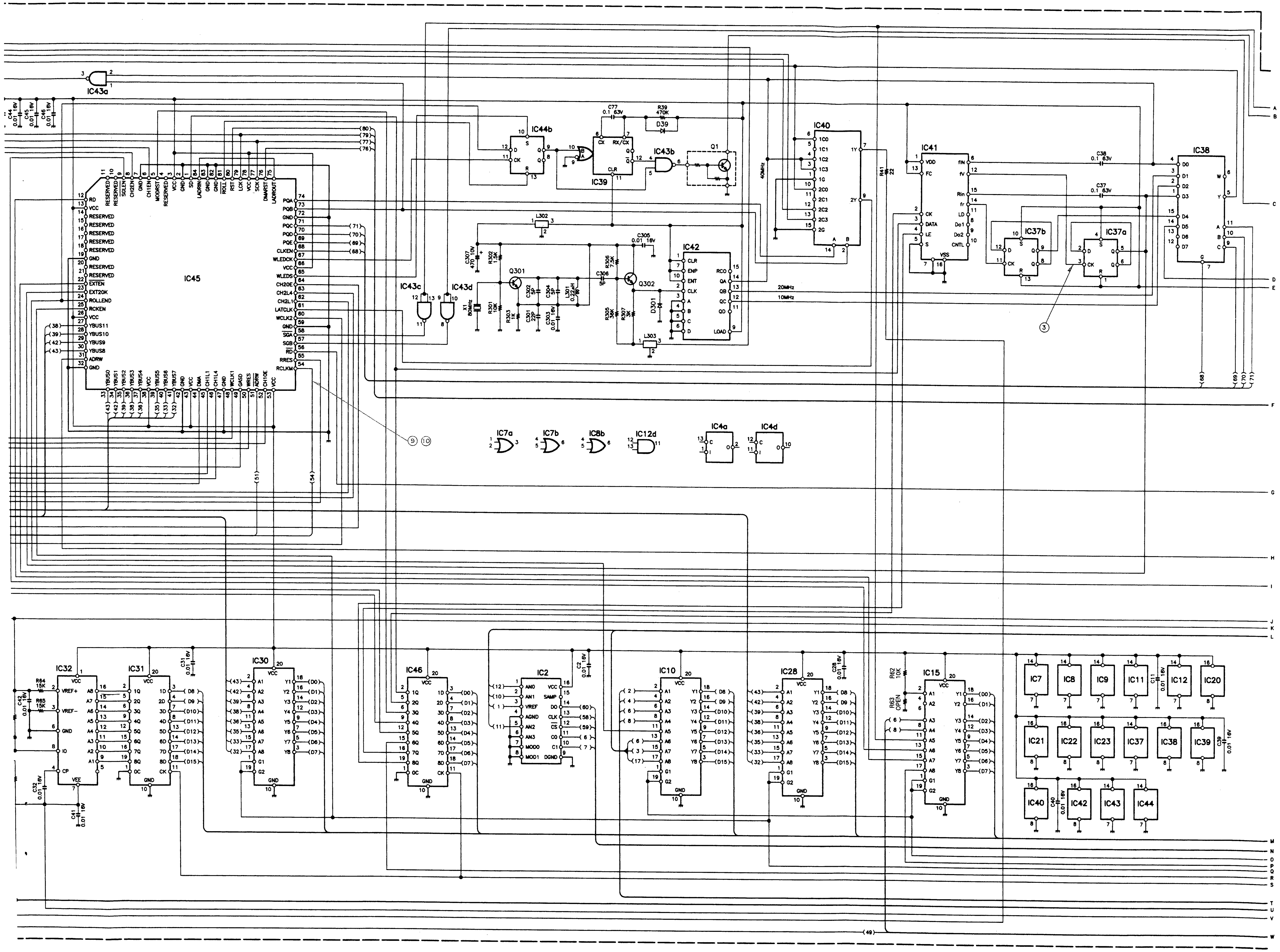

DSP UNIT (X79-1300-01)
CN528
GND
+5V
+12V
-12V
T-SEP
L3
L4
2.0V
34.8mV/div
4.0V
184mV/div
CN531
1AD+
AGND
1AD-
CH1
Q101
Q102
Q103
VR101 220(B)
VR102 220(B)
D100
IC100
IC102
IC103
IC104
IC44a
IC43a
CN532
2AD+
2AD-
CH2
Q201
Q202
Q203
VR201 220(B)
VR202 220(B)
D200
IC200
IC202
IC203
IC204
IC32
IC31
IC36b
R43 680
R37 10K
R38 30K
R40 7.5K
R64 15K
R65 15K
R25 33
R27 33
①
③

IC2 : MB88101APFV–GB
IC10,15,28,30 : HD74LS244FP
IC4 : HD14066BFP
IC7,8 : HD74LS32FP
IC9 : HD74LS74FP
IC11 : HD74HC86FP
IC12 : HD74HC08FP
IC20~23 : HD74LS157FP
IC31,46 : HD74LS374FP
IC32 : DAC0808LCM
IC36 : NJM072BD
IC37,44 : SN74AS74NS
IC38 : SN74AS151NS
IC39 : HD74HC123FP
IC40 : SN74AS153NS
IC41 : MB86001PF–GBND
IC42 : SN74F161ANS
IC43 : SN74AS00NS
IC45 : CTM5300
IC100,200 : AN8122FAP
IC102,202 : DTM6010
IC103,104,203,204 : HM63021FP–34 or
HM63021FP–28

Q1 : 2SC4049
Q101,102,201,202 : 2SC1923(O)
Q103,203 : 2SC1740S(R,S)
Q301,302 : 2SC3354(S)

D39 : 1SS132
D100,200,301 : MA700

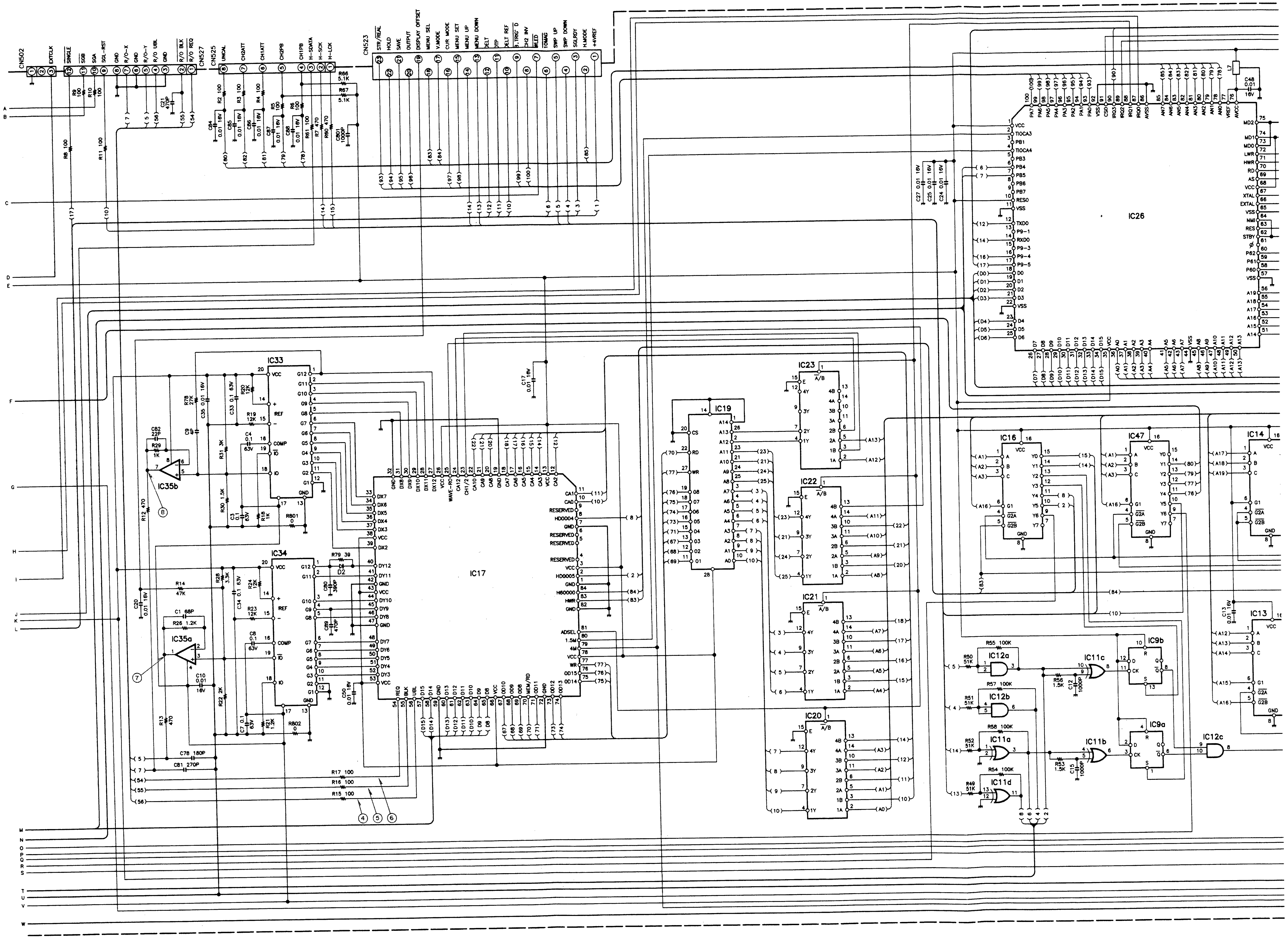
# 40 SCHEMATIC DIAGRAM


IC43a
IC45
IC44b
IC39
IC43b
Q1
C77 0.1 63V
R39 470K
D39
IC40
IC41
IC38
C38 0.1 63V
C37 0.1 63V
IC37b
IC37a
IC42
L302
L303
Q301
Q302
D301
X1
IC43c
IC43d
20MHz
10MHz
40MHz
R41 22
③
⑨ ⑩
IC7a
IC7b
IC8b
IC12d
IC4a
IC4d
IC32
IC31
IC30
IC46
IC2
IC10
IC28
IC15
R64 15K
R65 15K
R62 10K
R63 OPEN
IC7
IC8
IC9
IC11
IC12
IC20
IC21
IC22
IC23
IC37
IC38
IC39
IC40
IC42
IC43
IC44
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W

DCS-7040 (1/2)

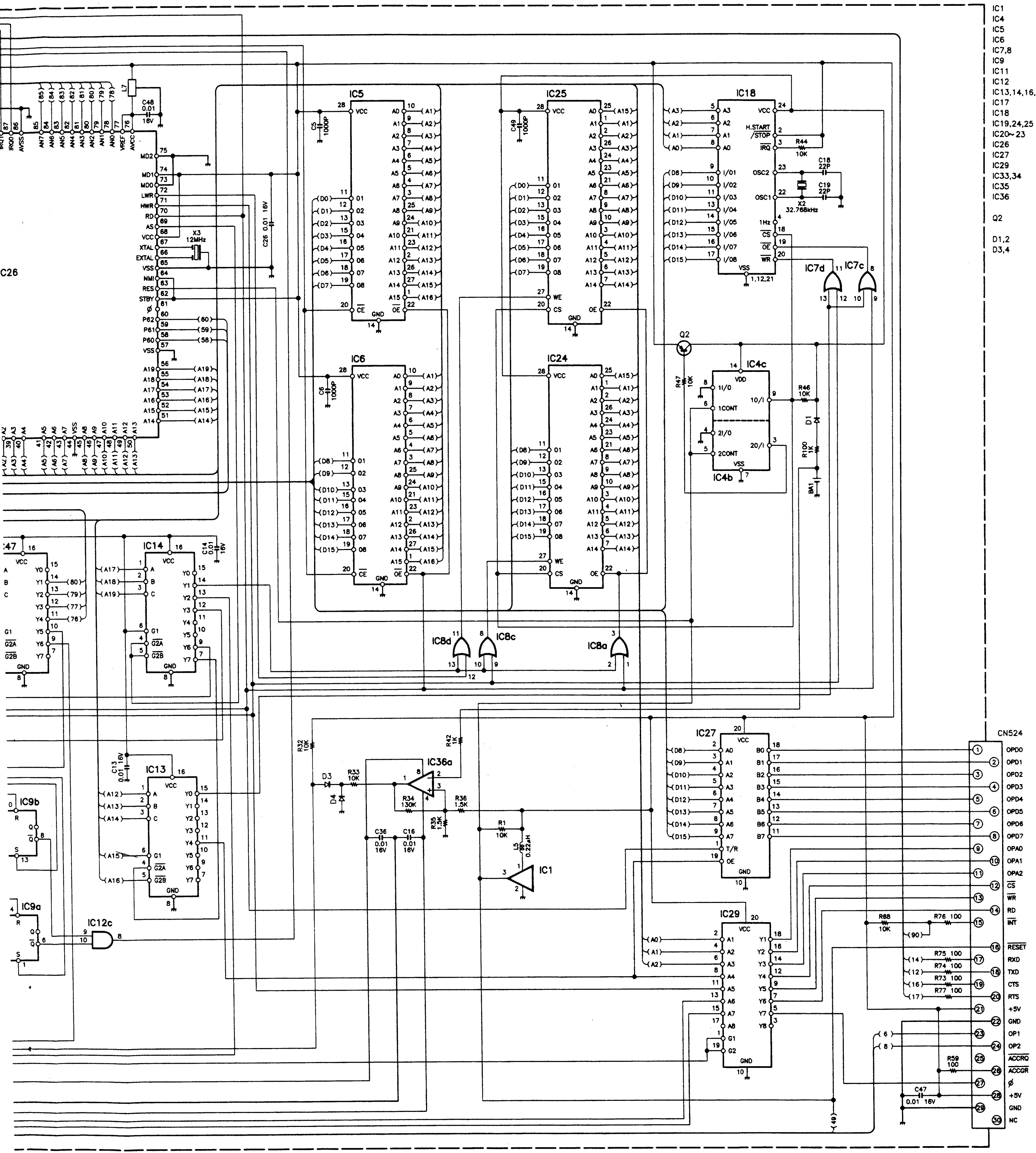
# DCS-7040 SCHEMATIC DI

## DSP UNIT (X79-1300-01)



CN502
EXTCLK
CN525
CN527
CN523
SINGLE
SGB
SGA
SGL-RST
GND
R/O-X
R/O-Y
R/O UBL
R/O BLK
R/O REQ
UNCAL
CH2ATT
CH1ATT
CH2PB
CH1PB
H-SDATA
H-SCK
H-LCK
STR/REAL
HOLD
SAVE
OUTPUT
DISPLAY OFFSET
MENU SEL
V.MODE
CUR MODE
MENU SET
MENU DOWN
MENU UP
DLT
DTP
DLT REF
S.TRIG'D
CH2 INV
WLED
10MAG
SWP UP
SWP DOWN
SGLRDY
H.MODE
+4VREF
IC26
IC33
IC34
IC35a
IC35b
IC17
IC19
IC23
IC22
IC21
IC20
IC16
IC47
IC14
IC13
IC12a
IC12b
IC12c
IC11a
IC11b
IC11c
IC11d
IC9a
IC9b
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W

# SCHEMATIC DIAGRAM


IC26
IC5
IC6
IC25
IC24
IC18
IC4c
IC4b
IC7d
IC7c
IC8d
IC8c
IC8a
IC47
IC14
IC13
IC9b
IC9a
IC12c
IC36a
IC1
IC27
IC29
Q2
X2 32.768kHz
X3 12MHz
CN524
① OPD0
② OPD1
③ OPD2
④ OPD3
⑤ OPD4
⑥ OPD5
⑦ OPD6
⑧ OPD7
⑨ OPA0
⑩ OPA1
⑪ OPA2
⑫ CS
⑬ WR
⑭ RD
⑮ INT
⑯ RESET
⑰ RXD
⑱ TXD
⑲ CTS
⑳ RTS
㉑ +5V
㉒ GND
㉓ OP1
㉔ OP2
㉕ ACCRQ
㉖ ACCGR
㉗ ø
㉘ +5V
㉙ GND
㉚ NC

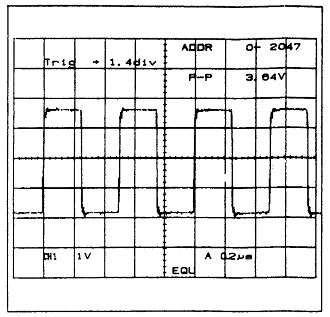
DCS-7040 (2/2)

IC1 : PST7045
IC4 : HD14066BFP
IC5 : T93-0893-05
IC6 : T93-0894-05
IC7,8 : HD74LS32FP
IC9 : HD74LS74FP
IC11 : HD74HC86FP
IC12 : HD74HC08FP
IC13,14,16,47 : HD74LS138FP
IC17 : CTM5290
IC18 : HD64610FP
IC19,24,25 : 62256BLFP7SL
IC20~23 : HD74LS157FP
IC26 : HD6433040A00F
IC27 : HD74HC245FP
IC29 : HD74HC244FP
IC33,34 : HA17012PB
IC35 : µPC814C
IC36 : NJM072BD

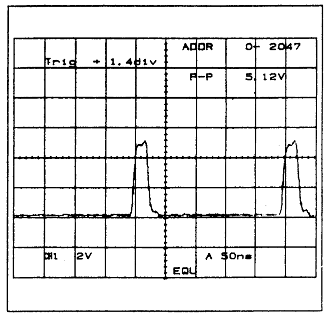
Q2 : 2SA933S(R,S)

D1,2 : MA700
D3,4 : 1SS132

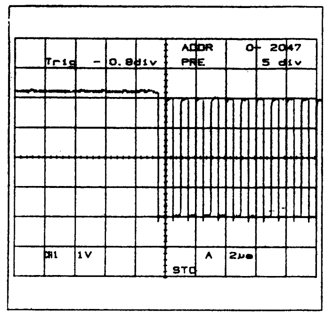
① 0.1ms/div



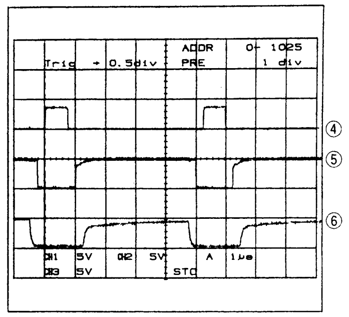
② 0.1ms/div



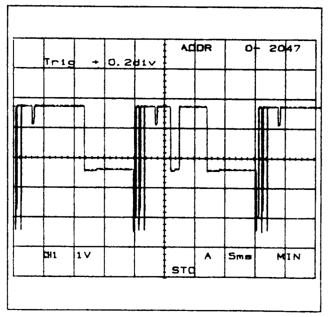
③ STO 0.1ms/div



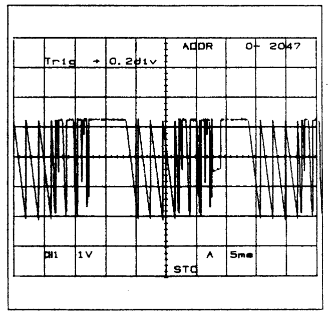
④, ⑤, ⑥ REAL



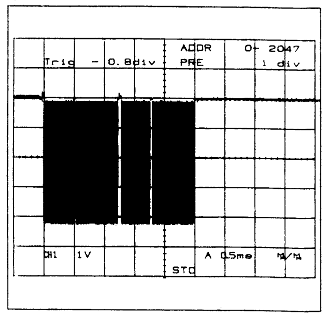
⑦ STO R/O Y



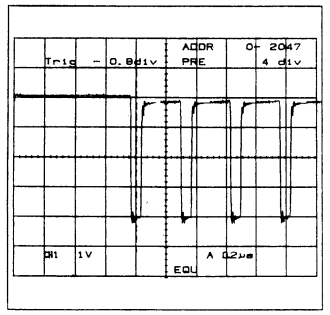
⑧ STO R/O X



⑨

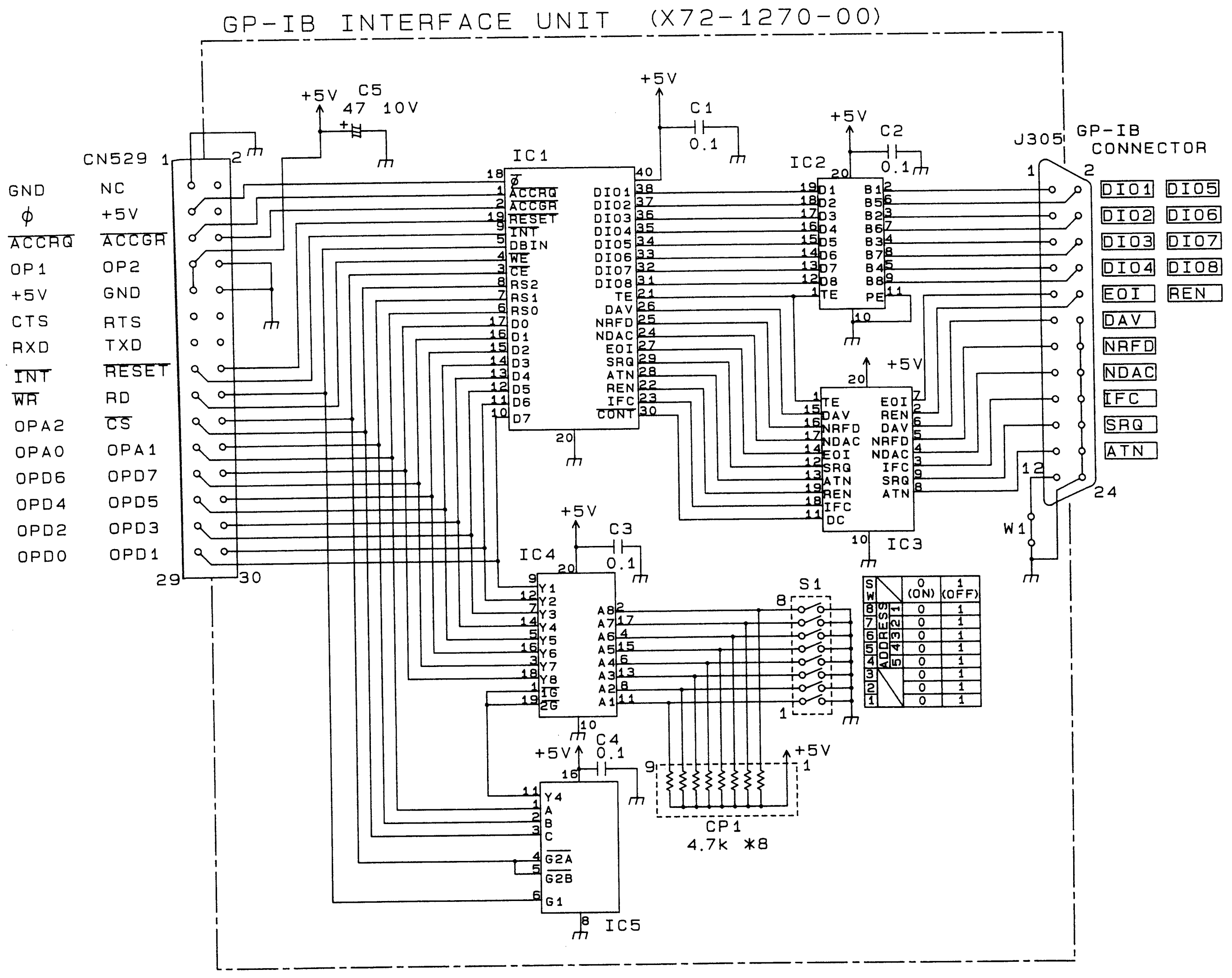


⑩



# SCHEMATIC DIAGRAM

## Option
## GP-IB INTERFACE UNIT (X72-1270-00)

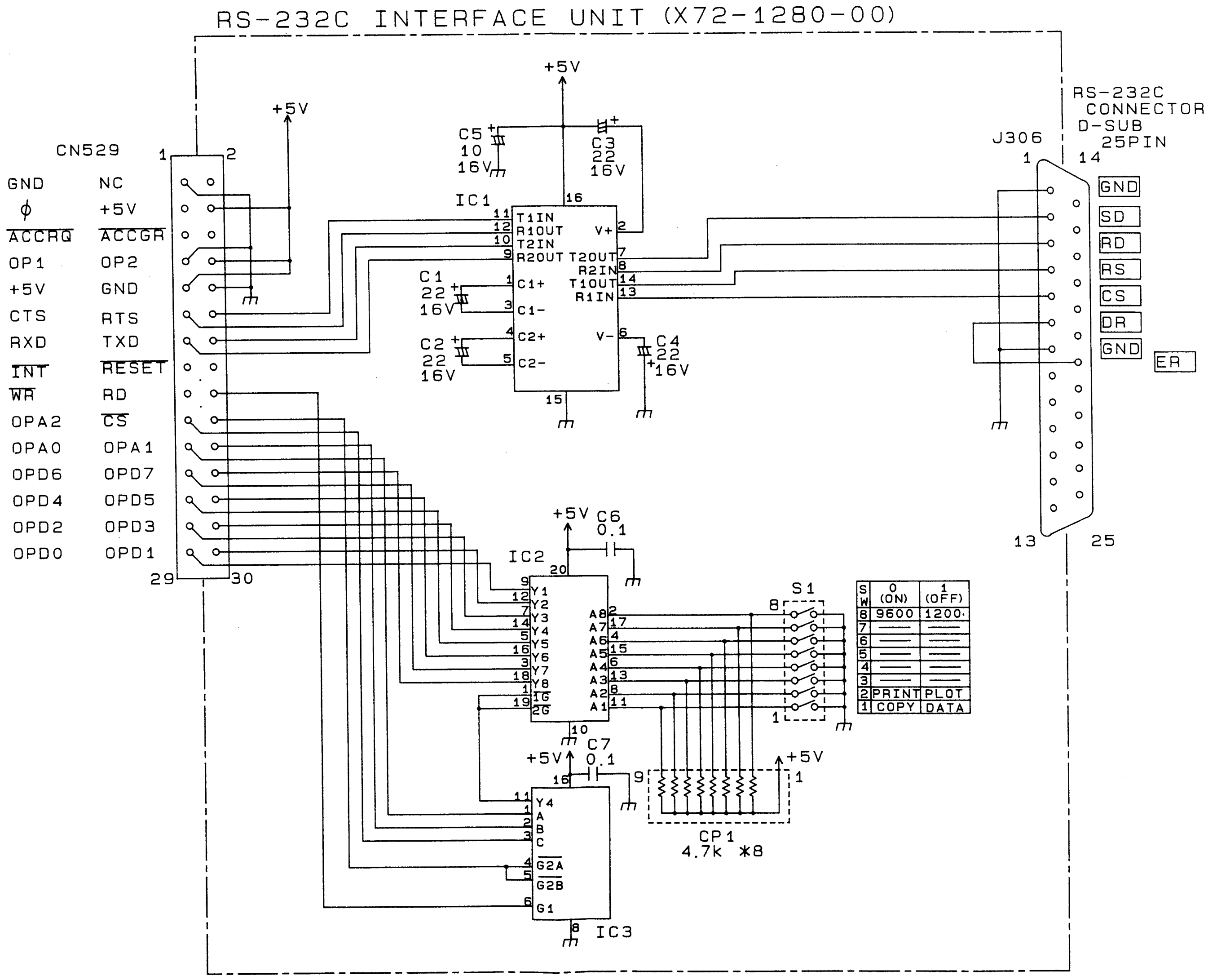

GP-IB INTERFACE UNIT (X72-1270-00)
CN529
GND
NC
ϕ
+5V
ACCRQ
ACCGR
OP1
OP2
+5V
GND
CTS
RTS
RXD
TXD
INT
RESET
WR
RD
OPA2
CS
OPA0
OPA1
OPD6
OPD7
OPD4
OPD5
OPD2
OPD3
OPD0
OPD1
+5V C5 47 10V
C1 0.1
C2 0.1
C3 0.1
C4 0.1
IC1
IC2
IC3
IC4
IC5
J305
GP-IB CONNECTOR
DIO1 DIO5
DIO2 DIO6
DIO3 DIO7
DIO4 DIO8
EOI REN
DAV
NRFD
NDAC
IFC
SRQ
ATN
W1
S1
CP1 4.7k *8

| SW | | 0 (ON) | 1 (OFF) |
|---|---|---|---|
| 8 | ADDRESS 1 | 0 | 1 |
| 7 | ADDRESS 2 | 0 | 1 |
| 6 | ADDRESS 3 | 0 | 1 |
| 5 | ADDRESS 4 | 0 | 1 |
| 4 | ADDRESS 5 | 0 | 1 |
| 3 | | 0 | 1 |
| 2 | | 0 | 1 |
| 1 | | 0 | 1 |

IC1 : TMS9914ANL
IC2 : SN75160AN
IC3 : SN75161AN
IC4 : TC74HC244AP
IC5 : TC74HC138AP

# SCHEMATIC DIAGRAM

## Option
## RS-232C INTERFACE UNIT (X72-1280-00)


RS-232C INTERFACE UNIT (X72-1280-00)
CN529
GND
NC
ϕ
+5V
ACCRQ
ACCGR
OP1
OP2
+5V
GND
CTS
RTS
RXD
TXD
INT
RESET
WR
RD
OPA2
CS
OPA0
OPA1
OPD6
OPD7
OPD4
OPD5
OPD2
OPD3
OPD0
OPD1
C5 10 16V
C3 22 16V
C1 22 16V
C2 22 16V
C4 22 16V
C6 0.1
C7 0.1
IC1
IC2
IC3
J306
RS-232C CONNECTOR D-SUB 25PIN
GND
SD
RD
RS
CS
DR
GND
ER
S1
CP1 4.7k *8

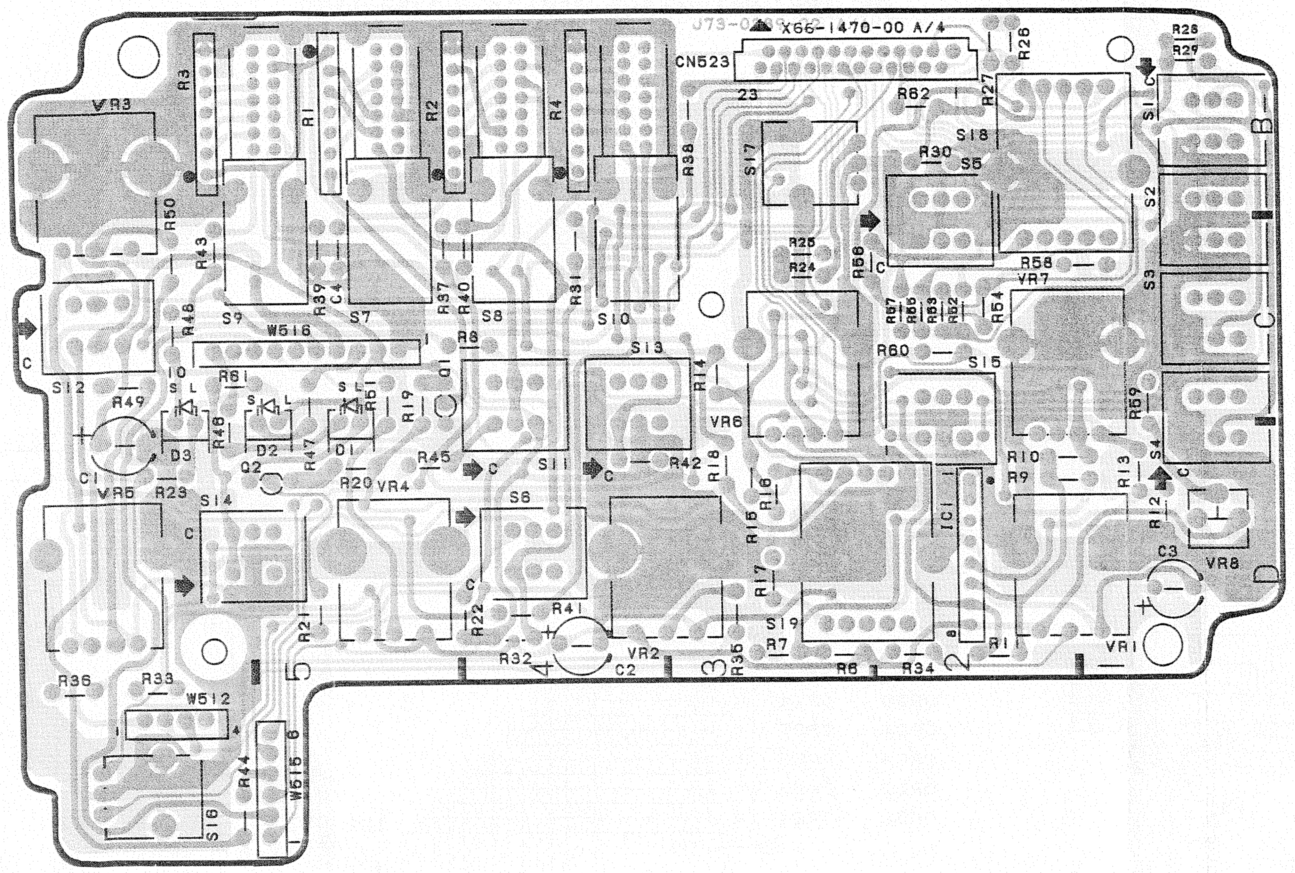
| SW | 0 (ON) | 1 (OFF) |
|---|---|---|
| 8 | 9600 | 1200 |
| 7 | ——— | ——— |
| 6 | ——— | ——— |
| 5 | ——— | ——— |
| 4 | ——— | ——— |
| 3 | ——— | ——— |
| 2 | PRINT | PLOT |
| 1 | COPY | DATA |

IC1 : MAX232CPE
IC2 : TC74HC244AP
IC3 : TC74HC138AP

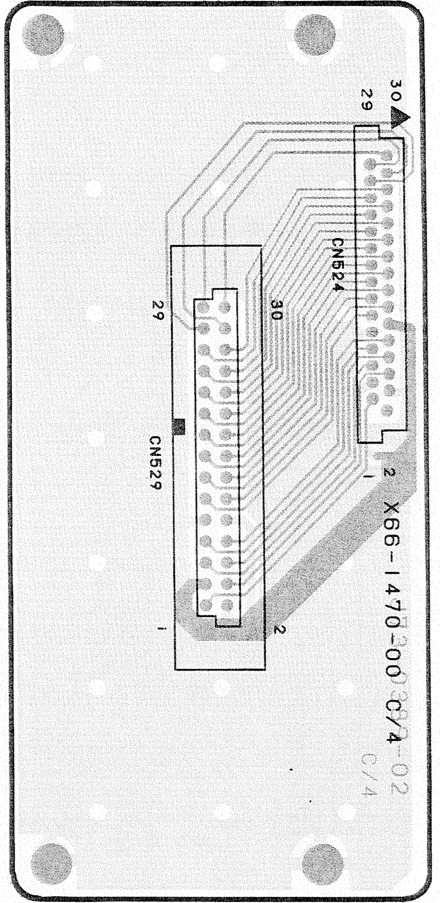
# P. C. BOARD

## PANEL UNIT (X66-1470-00)

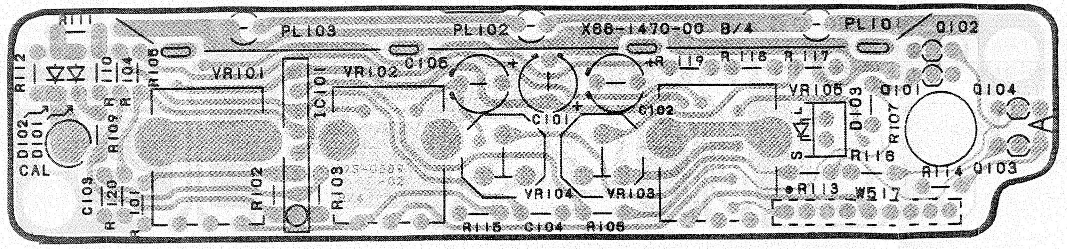
Pattern side view

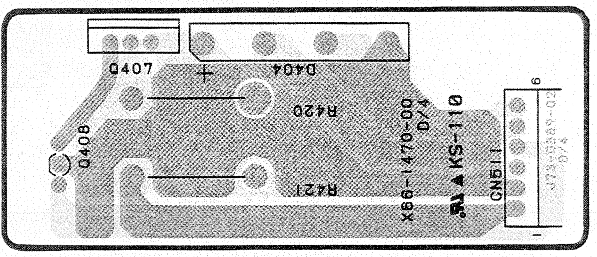

X66-1470-00 A/4
CN523
VR1
VR2
VR3
VR4
VR5
VR6
VR7
VR8
IC1
Q1
Q2
D1
D2
D3
C1
C2
C3
C4
W512
W515
W516
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S19

Pattern side view


X66-1470-00 C/4
CN524
CN529

Pattern side view

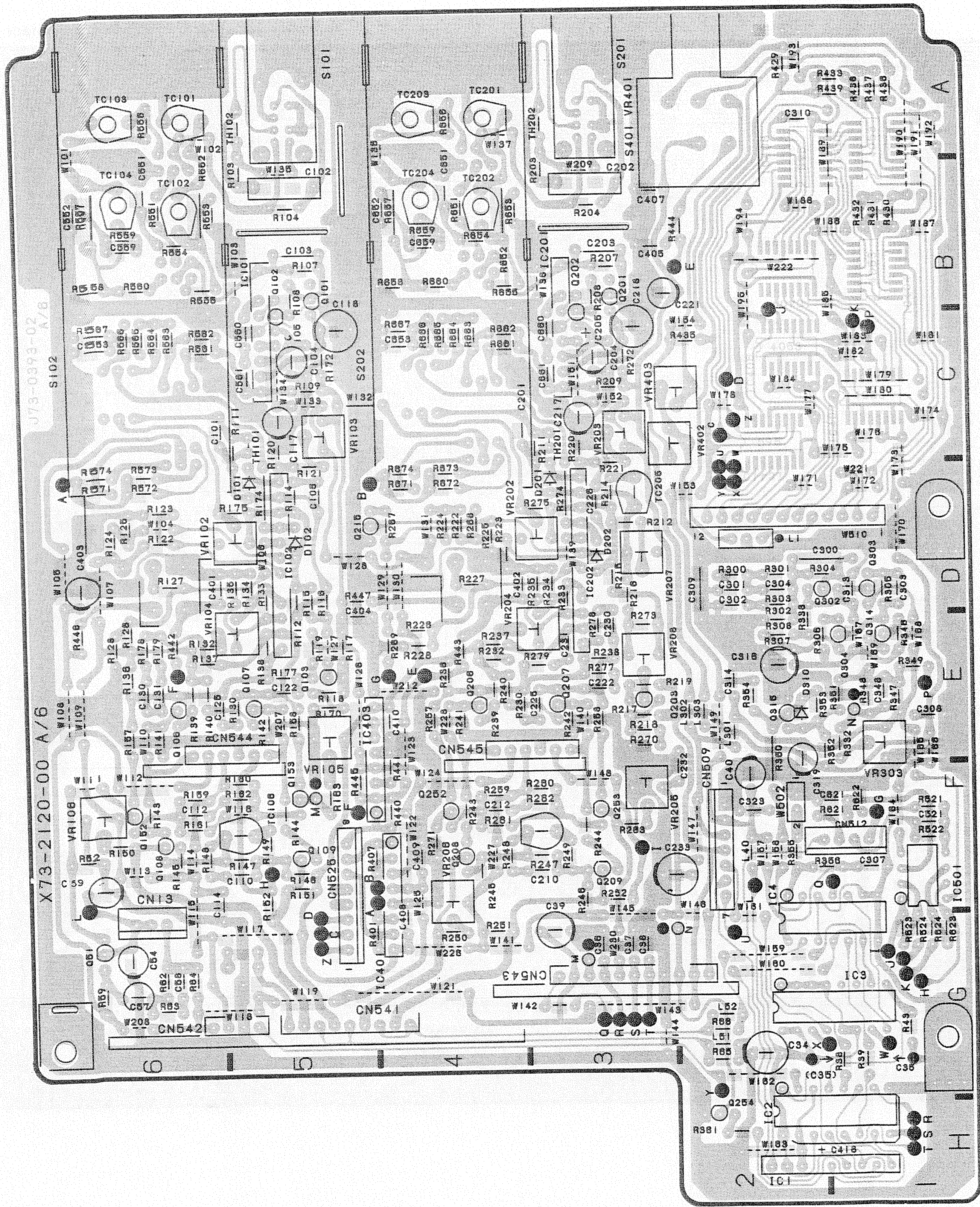

X66-1470-00 B/4
PL101
PL102
PL103
VR101
VR102
VR103
VR104
VR105
IC101
Q101
Q102
Q103
Q104
D101
D102
D103
C101
C102
C103
C104
C105
W517
CAL

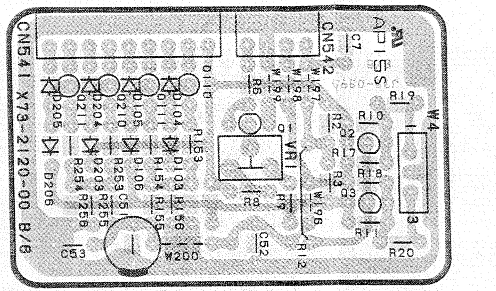

X66-1470-00 D/4
KS-110
Q407
Q408
D404
R420
R421
CN511

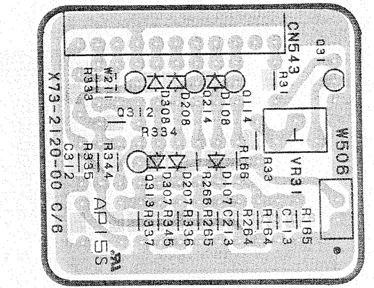
# P. C. BOARD

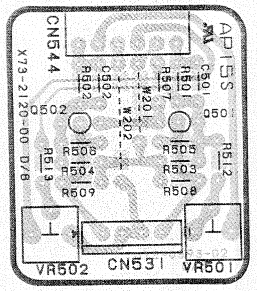
**PRE AMP UNIT (X73-2120-00)**

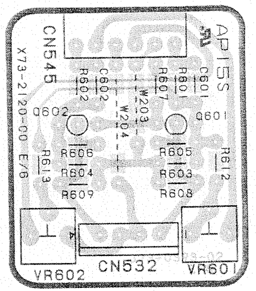
Pattern side view


X73-2120-00 A/6
S101
S201
S401
S102
S202
CN541
CN542
CN543
CN544
CN545
IC1
IC2
IC3
IC501
VR105
VR303

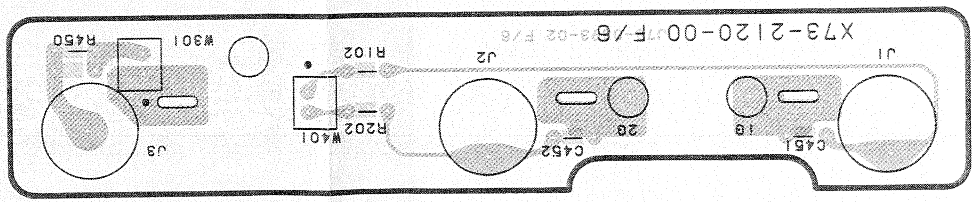

CN541 X73-2120-00 B/6
CN542
AP15S
VR1


CN543
X73-2120-00 C/6
AP15S
VR31
W506


CN544
X73-2120-00 D/6
AP15S
VR502
CN531
VR501


CN545
X73-2120-00 E/6
AP15S
VR602
CN532
VR601

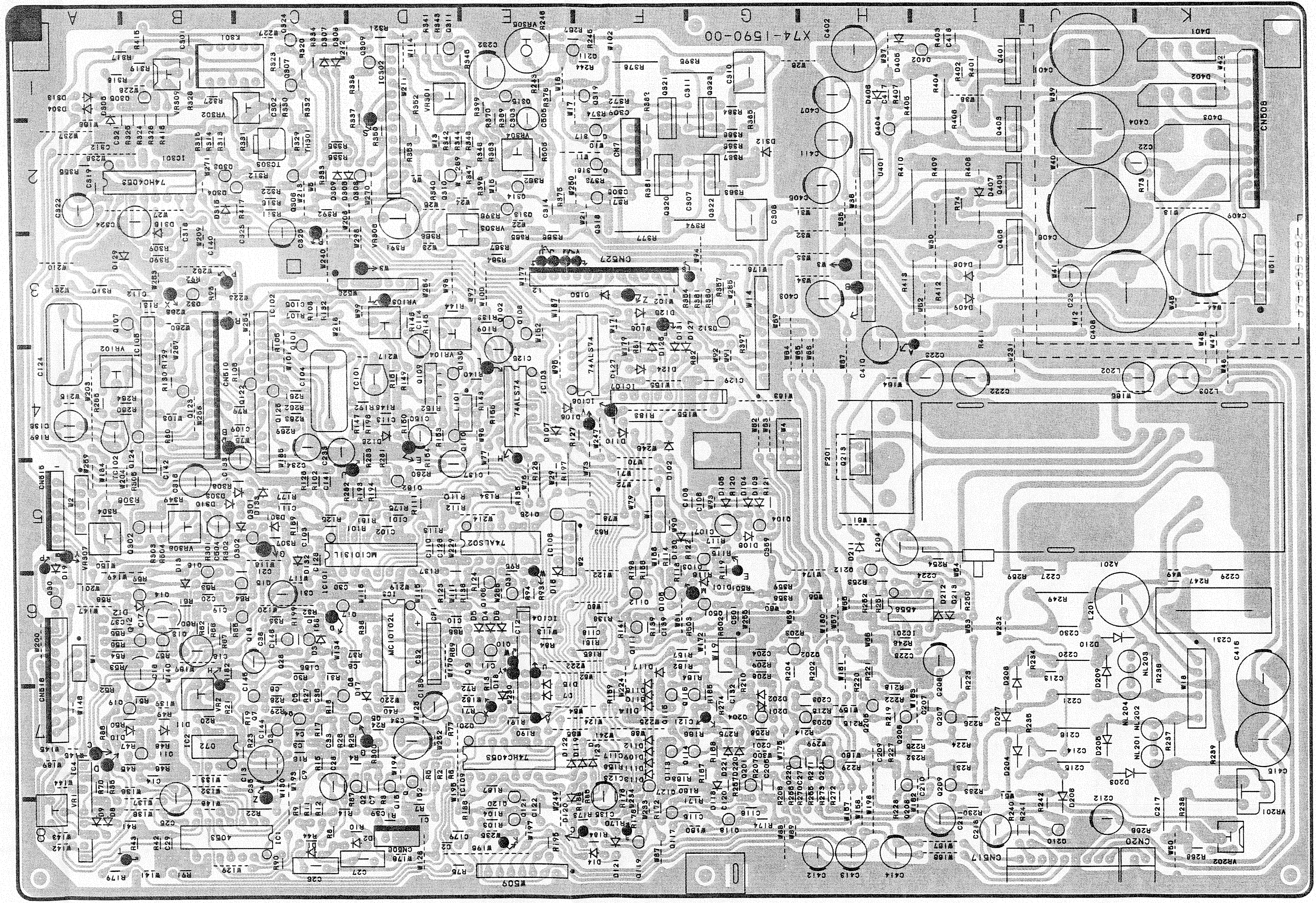
Pattern side view


X73-2120-00 F/6
J1
J2
J3

# P. C. BOARD

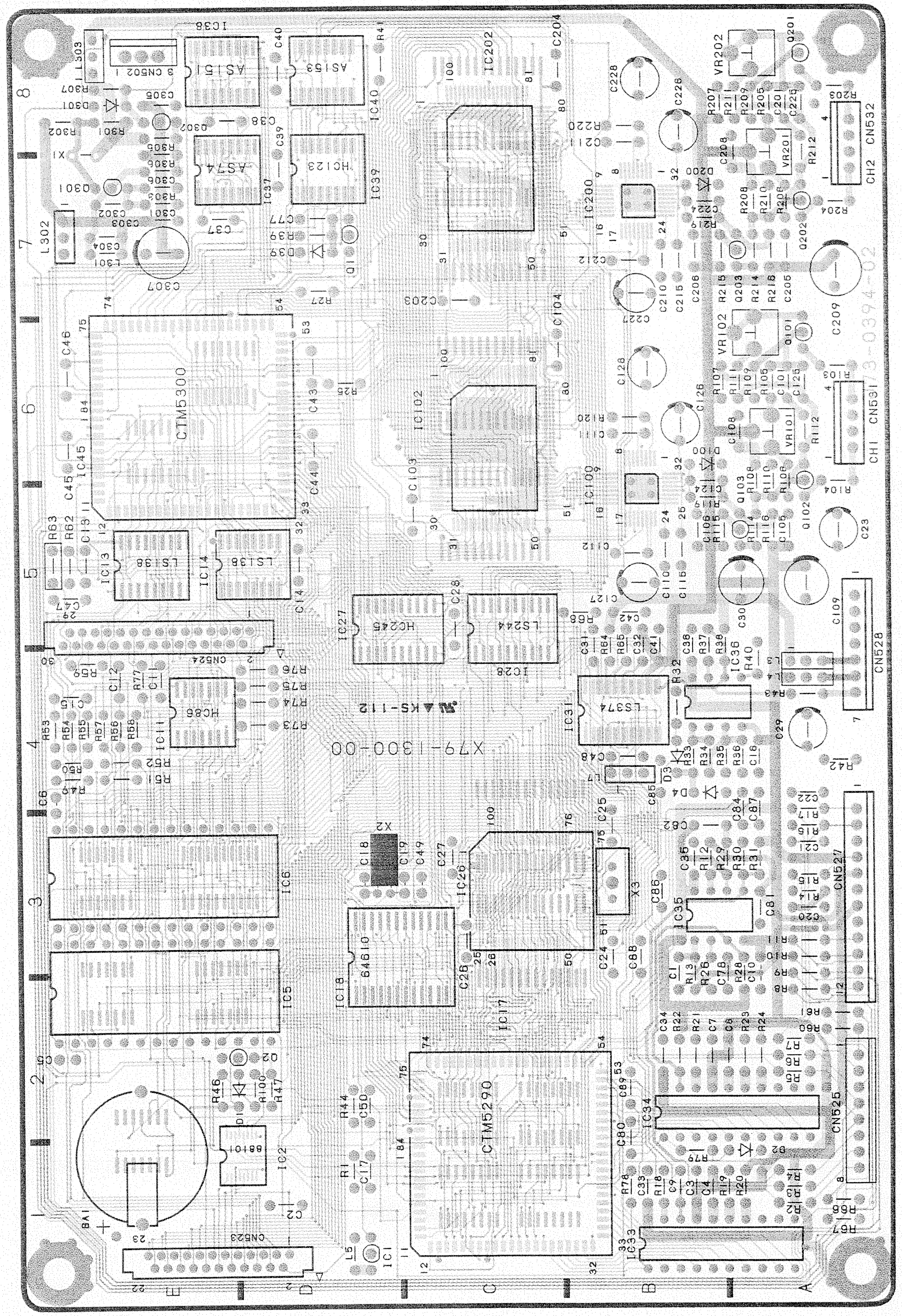
## SWEEP UNIT (X74-1590-00)

Pattern side view

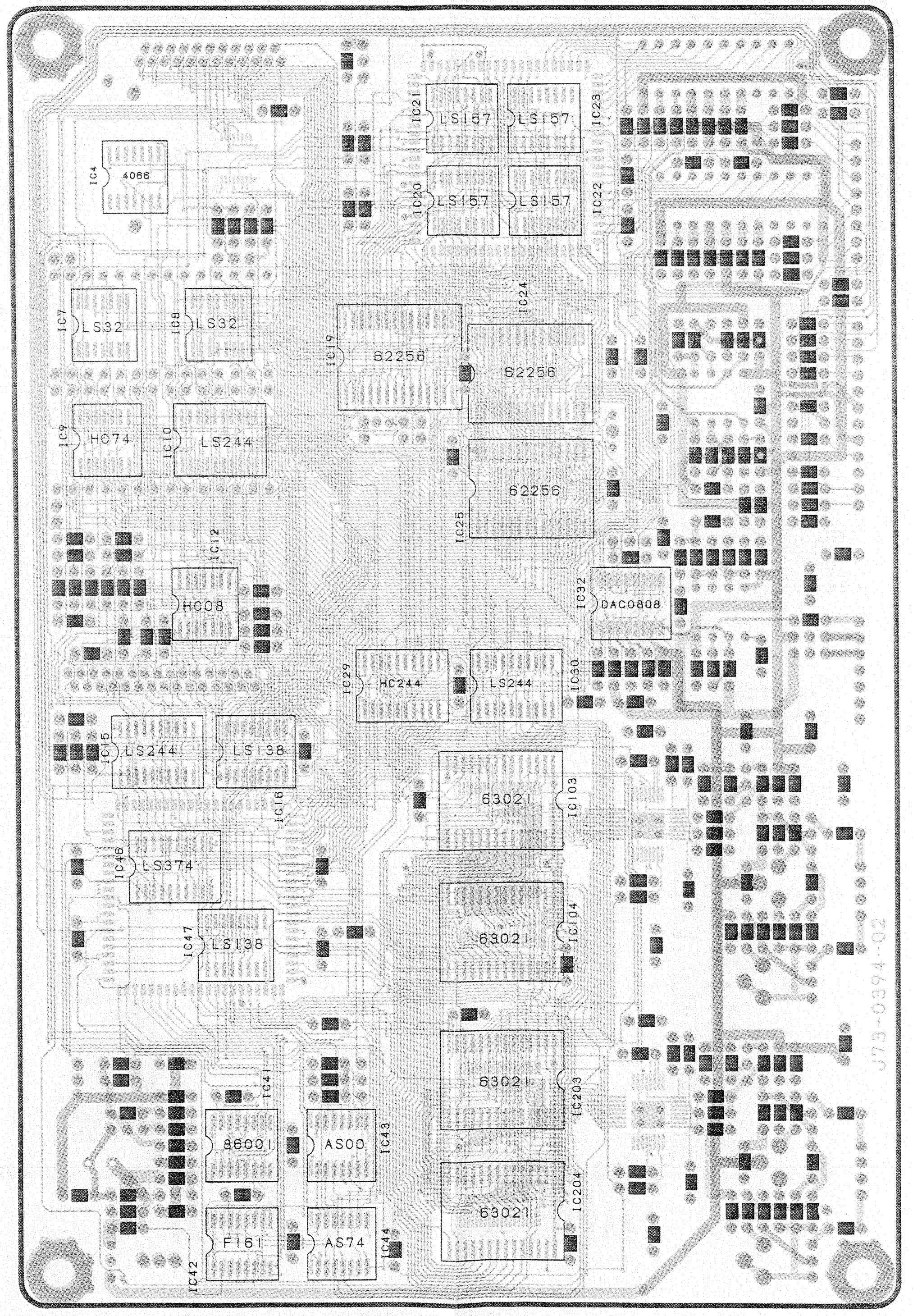

A
B
C
D
E
F
G
H
I
J
K
1
2
3
4
5
6
7
8
X74-1590-00

# P. C. BOARD

## DSP UNIT (X79-1300-0X)

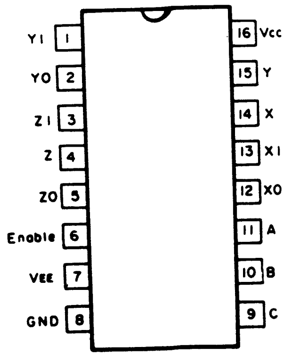


IC36
AS151
AS153
AS74
HC123
CTM5300
IC102
IC202
LS138
HC245
LS244
LS374
HC86
IC6
IC5
64610
CTM5290
IC26
IC17
X79-1300-00
KS-112
CN532
CN531
CN528
CN527
CN525
CN523
CN524
CN502
CH1
CH2
VR202
VR102
BA1
X1
X2
X3
J73-0394-02

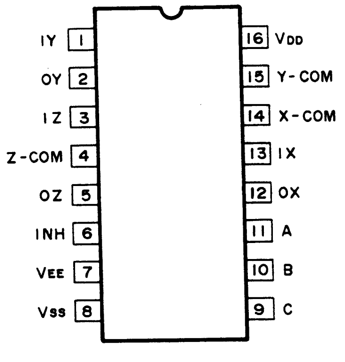


4066
LS157
LS157
LS157
LS157
LS32
LS32
HC74
LS244
62256
62256
62256
HC08
DAC0808
HC244
LS244
LS244
LS138
LS374
LS138
63021
63021
63021
63021
86001
AS00
F161
AS74
J73-0394-02

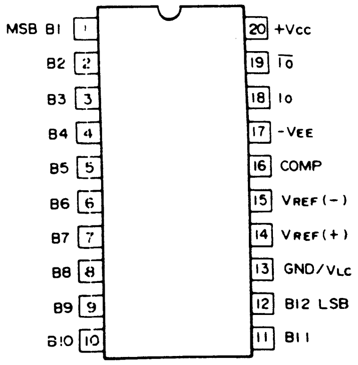
# SEMICONDUCTORS


Y1 1
YO 2
Z1 3
Z 4
ZO 5
Enable 6
VEE 7
GND 8
16 Vcc
15 Y
14 X
13 X1
12 XO
11 A
10 B
9 C

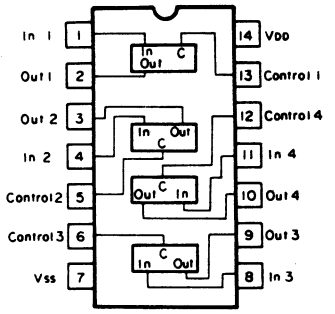
TC74HC4053AP


1Y 1
OY 2
1Z 3
Z-COM 4
OZ 5
INH 6
VEE 7
Vss 8
16 VDD
15 Y-COM
14 X-COM
13 1X
12 OX
11 A
10 B
9 C

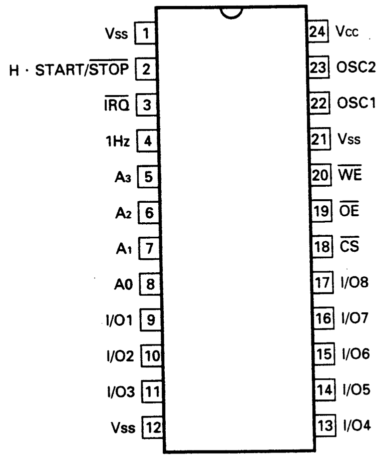
TC4053BF
TC4053BP


MSB B1 1
B2 2
B3 3
B4 4
B5 5
B6 6
B7 7
B8 8
B9 9
B10 10
20 +Vcc
19 $\overline{I0}$
18 I0
17 -VEE
16 COMP
15 VREF(-)
14 VREF(+)
13 GND/VLC
12 B12 LSB
11 B11

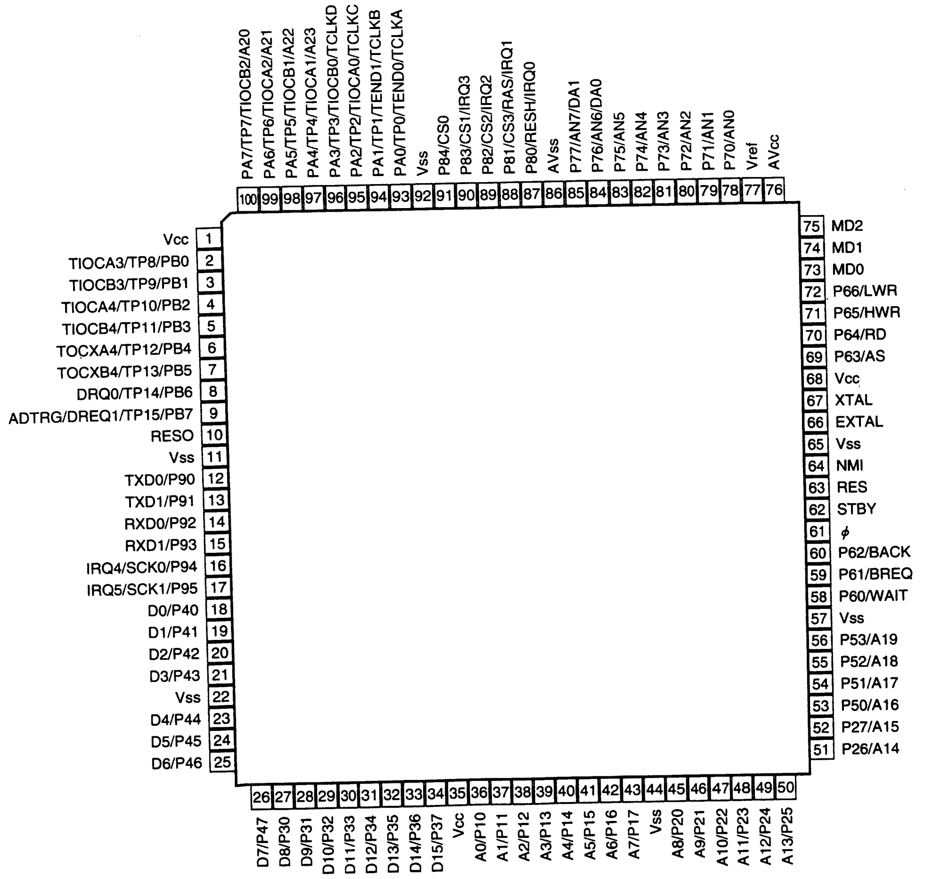
HA17012PB


In 1 1
Out 1 2
Out 2 3
In 2 4
Control 2 5
Control 3 6
Vss 7
14 VDD
13 Control 1
12 Control 4
11 In 4
10 Out 4
9 Out 3
8 In 3
In
Out
C

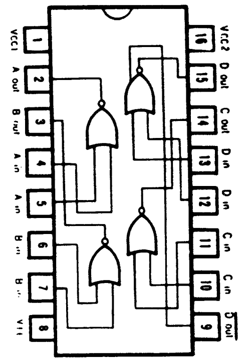
HD14066BFP


Vss 1
H · START/$\overline{STOP}$ 2
$\overline{IRQ}$ 3
1Hz 4
A3 5
A2 6
A1 7
A0 8
I/O1 9
I/O2 10
I/O3 11
Vss 12
24 Vcc
23 OSC2
22 OSC1
21 Vss
20 $\overline{WE}$
19 $\overline{OE}$
18 $\overline{CS}$
17 I/O8
16 I/O7
15 I/O6
14 I/O5
13 I/O4

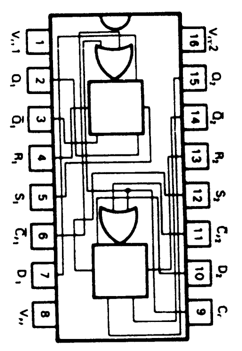
HD64610FP


Vcc 1
TIOCA3/TP8/PB0 2
TIOCB3/TP9/PB1 3
TIOCA4/TP10/PB2 4
TIOCB4/TP11/PB3 5
TOCXA4/TP12/PB4 6
TOCXB4/TP13/PB5 7
DRQ0/TP14/PB6 8
ADTRG/DREQ1/TP15/PB7 9
RESO 10
Vss 11
TXD0/P90 12
TXD1/P91 13
RXD0/P92 14
RXD1/P93 15
IRQ4/SCK0/P94 16
IRQ5/SCK1/P95 17
D0/P40 18
D1/P41 19
D2/P42 20
D3/P43 21
Vss 22
D4/P44 23
D5/P45 24
D6/P46 25
26 D7/P47
27 D8/P30
28 D9/P31
29 D10/P32
30 D11/P33
31 D12/P34
32 D13/P35
33 D14/P36
34 D15/P37
35 Vcc
36 A0/P10
37 A1/P11
38 A2/P12
39 A3/P13
40 A4/P14
41 A5/P15
42 A6/P16
43 A7/P17
44 Vss
45 A8/P20
46 A9/P21
47 A10/P22
48 A11/P23
49 A12/P24
50 A13/P25
51 P26/A14
52 P27/A15
53 P50/A16
54 P51/A17
55 P52/A18
56 P53/A19
57 Vss
58 P60/WAIT
59 P61/BREQ
60 P62/BACK
61 ϕ
62 STBY
63 RES
64 NMI
65 Vss
66 EXTAL
67 XTAL
68 Vcc
69 P63/AS
70 P64/RD
71 P65/HWR
72 P66/LWR
73 MD0
74 MD1
75 MD2
76 AVcc
77 Vref
78 P70/AN0
79 P71/AN1
80 P72/AN2
81 P73/AN3
82 P74/AN4
83 P75/AN5
84 P76/AN6/DA0
85 P77/AN7/DA1
86 AVss
87 P80/RESH/IRQ0
88 P81/CS3/RAS/IRQ1
89 P82/CS2/IRQ2
90 P83/CS1/IRQ3
91 P84/CS0
92 Vss
93 PA0/TP0/TEND0/TCLKA
94 PA1/TP1/TEND1/TCLKB
95 PA2/TP2/TIOCA0/TCLKC
96 PA3/TP3/TIOCB0/TCLKD
97 PA4/TP4/TIOCA1/A23
98 PA5/TP5/TIOCB1/A22
99 PA6/TP6/TIOCA2/A21
100 PA7/TP7/TIOCB2/A20

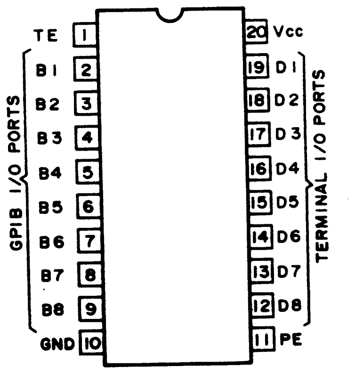
HD6433040A00F


VCC1 1
A out 2
B out 3
A in 4
A in 5
B in 6
B in 7
VEE 8
16 VCC2
15 D out
14 C out
13 D in
12 D in
11 C in
10 C in
9 $\overline{D}$ out

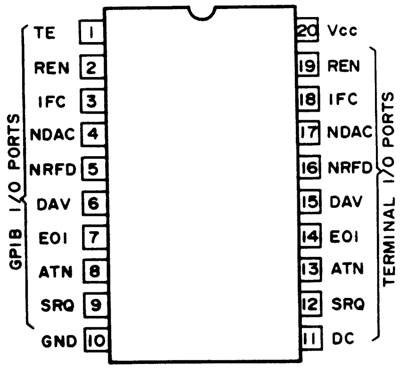
MC10102L


$V_{CC}1$ 1
$Q_1$ 2
$\overline{Q}_1$ 3
$R_1$ 4
$S_1$ 5
$\overline{C}_{E1}$ 6
$D_1$ 7
$V_{EE}$ 8
16 $V_{CC}2$
15 $Q_2$
14 $\overline{Q}_2$
13 $R_2$
12 $S_2$
11 $\overline{C}_{E2}$
10 $D_2$
9 $C_C$

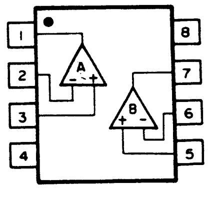
MC10131L


TE 1
B1 2
B2 3
B3 4
B4 5
B5 6
B6 7
B7 8
B8 9
GND 10
20 Vcc
19 D1
18 D2
17 D3
16 D4
15 D5
14 D6
13 D7
12 D8
11 PE
GPIB I/O PORTS
TERMINAL I/O PORTS

SN75160AN

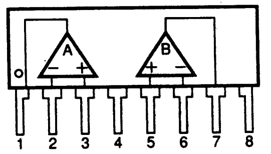

TE 1
REN 2
IFC 3
NDAC 4
NRFD 5
DAV 6
EOI 7
ATN 8
SRQ 9
GND 10
20 Vcc
19 REN
18 IFC
17 NDAC
16 NRFD
15 DAV
14 EOI
13 ATN
12 SRQ
11 DC
GPIB I/O PORTS
TERMINAL I/O PORTS

SN75161AN


1
2
3
4
5
6
7
8
A
B

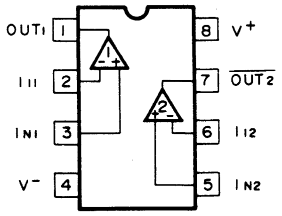
Pin name
1. A OUTPUT
2. A (−) INPUT
3. A (+) INPUT
4. V⁻
5. B (+) INPUT
6. B (−) INPUT
7. B OUTPUT
8. V⁺

NJM072BD
NJM4558D


A
B
1
2
3
4
5
6
7
8

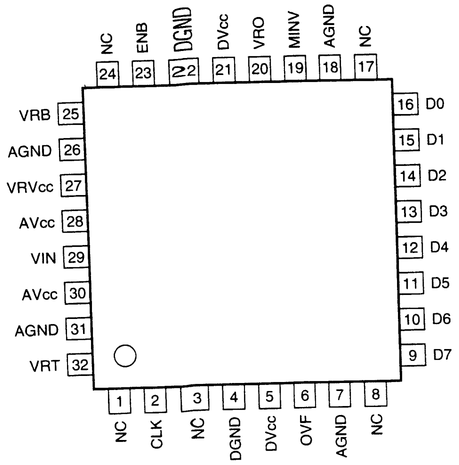
Pin name
1. A OUTPUT
2. A−INPUT
3. A+INPUT
4. V−
5. B+INPUT
6. B−INPUT
7. B OUTPUT
8. V+

NJM072L
NJM4558L


OUT1 1
I1 2
IN1 3
V⁻ 4
8 V⁺
7 $\overline{OUT2}$
6 I2
5 IN2
1
2

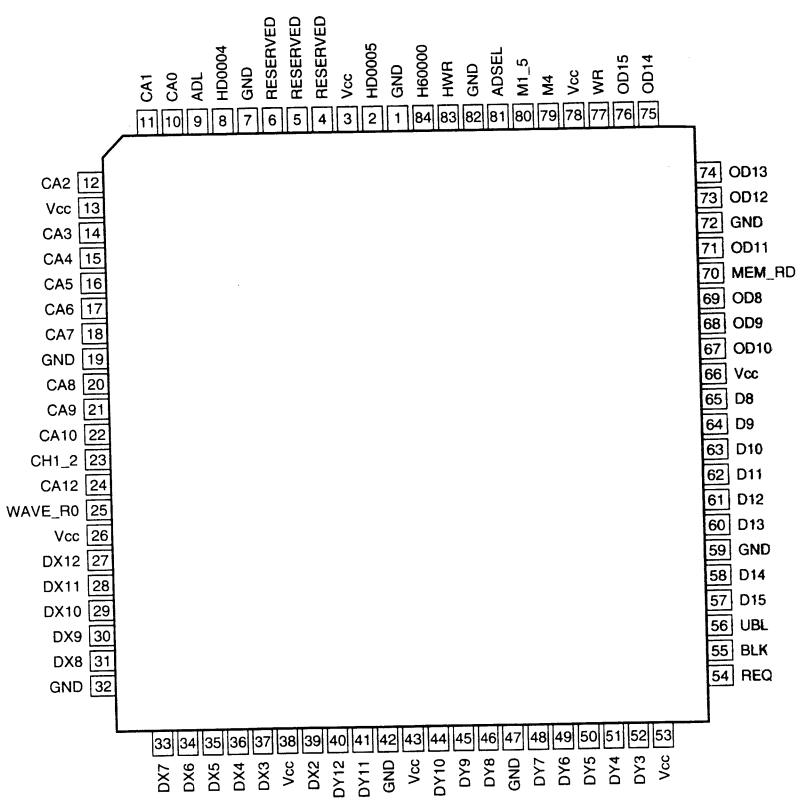
µPC814C

# SEMICONDUCTORS



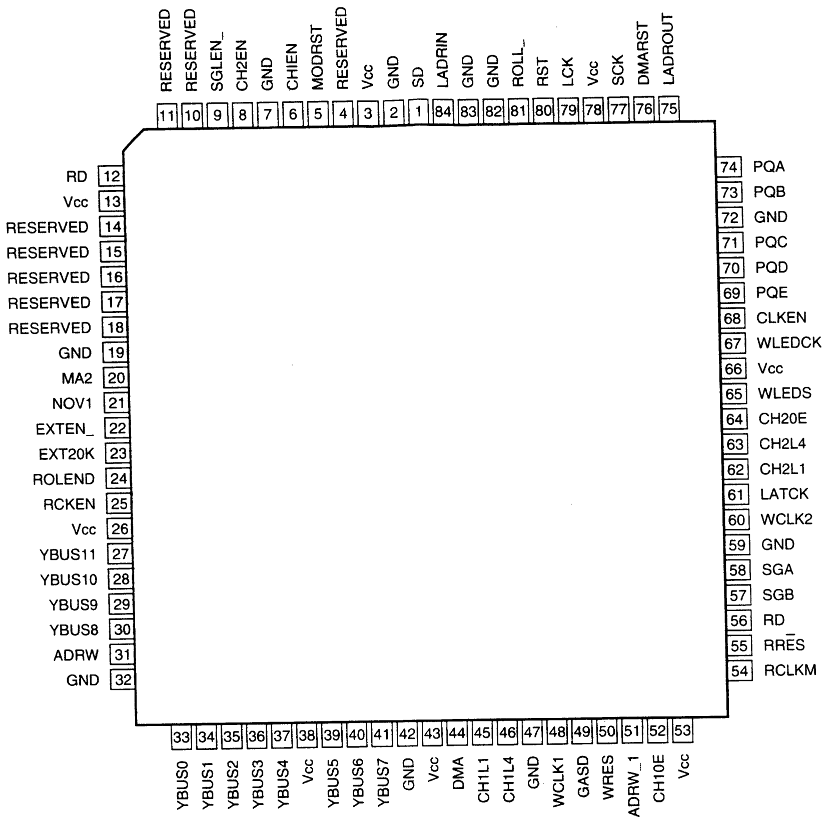
NC 24
ENB 23
DGND 22
DVcc 21
VRO 20
MINV 19
AGND 18
NC 17
VRB 25
AGND 26
VRVcc 27
AVcc 28
VIN 29
AVcc 30
AGND 31
VRT 32
16 D0
15 D1
14 D2
13 D3
12 D4
11 D5
10 D6
9 D7
1 NC
2 CLK
3 NC
4 DGND
5 DVcc
6 OVF
7 AGND
8 NC

AN8122FAP



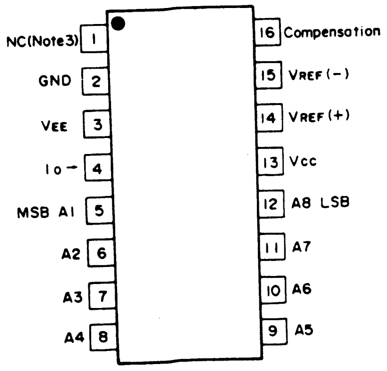
CA1 11
CA0 10
ADL 9
HD0004 8
GND 7
RESERVED 6
RESERVED 5
RESERVED 4
Vcc 3
HD0005 2
GND 1
H60000 84
HWR 83
GND 82
ADSEL 81
M1_5 80
M4 79
Vcc 78
WR 77
OD15 76
OD14 75
CA2 12
Vcc 13
CA3 14
CA4 15
CA5 16
CA6 17
CA7 18
GND 19
CA8 20
CA9 21
CA10 22
CH1_2 23
CA12 24
WAVE_R0 25
Vcc 26
DX12 27
DX11 28
DX10 29
DX9 30
DX8 31
GND 32
74 OD13
73 OD12
72 GND
71 OD11
70 MEM_RD
69 OD8
68 OD9
67 OD10
66 Vcc
65 D8
64 D9
63 D10
62 D11
61 D12
60 D13
59 GND
58 D14
57 D15
56 UBL
55 BLK
54 REQ
33 DX7
34 DX6
35 DX5
36 DX4
37 DX3
38 Vcc
39 DX2
40 DY12
41 DY11
42 GND
43 Vcc
44 DY10
45 DY9
46 DY8
47 GND
48 DY7
49 DY6
50 DY5
51 DY4
52 DY3
53 Vcc

CTM5290



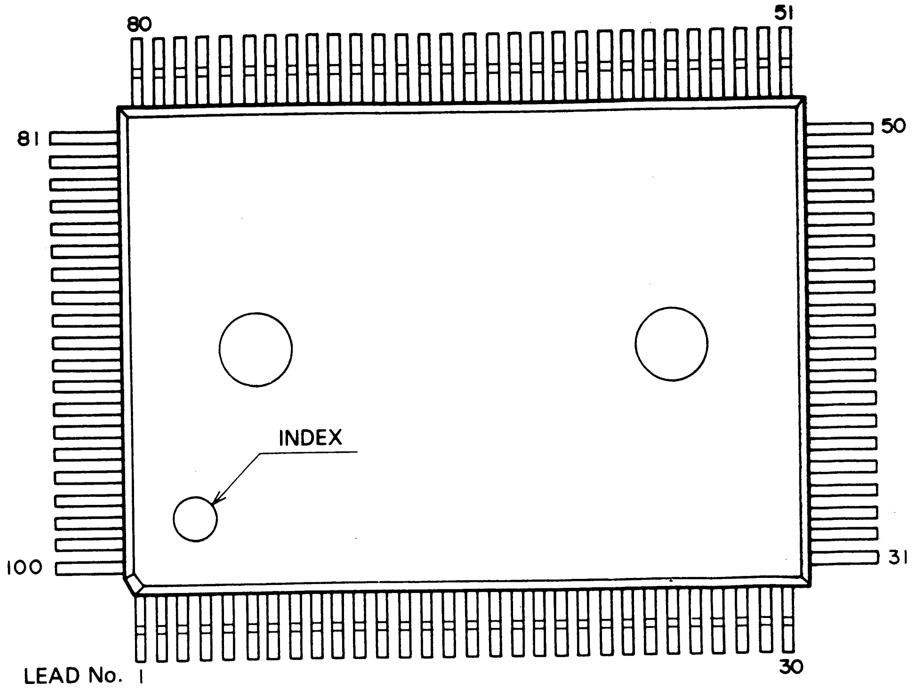
RESERVED 11
RESERVED 10
SGLEN_ 9
CH2EN 8
GND 7
CHIEN 6
MODRST 5
RESERVED 4
Vcc 3
GND 2
SD 1
LADRIN 84
GND 83
GND 82
ROLL_ 81
RST 80
LCK 79
Vcc 78
SCK 77
DMARST 76
LADROUT 75
RD 12
Vcc 13
RESERVED 14
RESERVED 15
RESERVED 16
RESERVED 17
RESERVED 18
GND 19
MA2 20
NOV1 21
EXTEN_ 22
EXT20K 23
ROLEND 24
RCKEN 25
Vcc 26
YBUS11 27
YBUS10 28
YBUS9 29
YBUS8 30
ADRW 31
GND 32
74 PQA
73 PQB
72 GND
71 PQC
70 PQD
69 PQE
68 CLKEN
67 WLEDCK
66 Vcc
65 WLEDS
64 CH20E
63 CH2L4
62 CH2L1
61 LATCK
60 WCLK2
59 GND
58 SGA
57 SGB
56 RD
55 RRES
54 RCLKM
33 YBUS0
34 YBUS1
35 YBUS2
36 YBUS3
37 YBUS4
38 Vcc
39 YBUS5
40 YBUS6
41 YBUS7
42 GND
43 Vcc
44 DMA
45 CH1L1
46 CH1L4
47 GND
48 WCLK1
49 GASD
50 WRES
51 ADRW_1
52 CH10E
53 Vcc

CTM5300



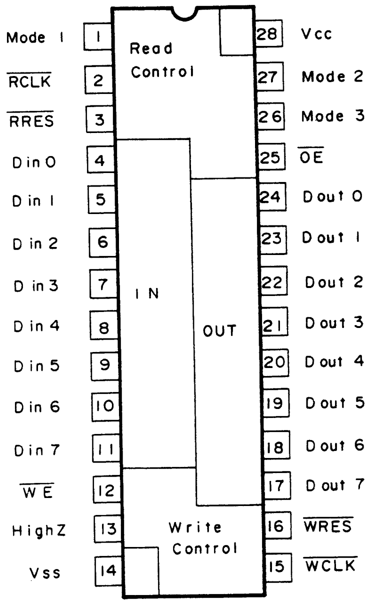
NC(Note3) 1
GND 2
VEE 3
Io− 4
MSB A1 5
A2 6
A3 7
A4 8
16 Compensation
15 VREF(−)
14 VREF(+)
13 Vcc
12 A8 LSB
11 A7
10 A6
9 A5

DAC0808LCM



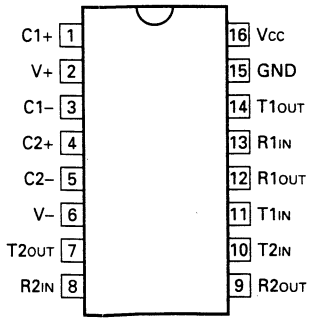
80
51
81
50
INDEX
100
31
LEAD No. 1
30

DTM6010



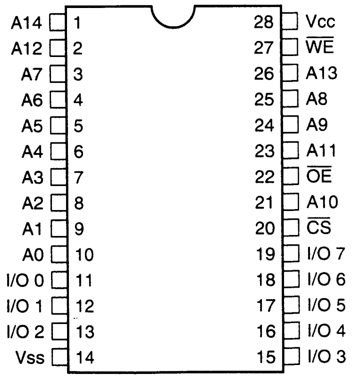
Mode 1 1
RCLK 2
RRES 3
Din 0 4
Din 1 5
Din 2 6
Din 3 7
Din 4 8
Din 5 9
Din 6 10
Din 7 11
WE 12
HighZ 13
Vss 14
28 Vcc
27 Mode 2
26 Mode 3
25 OE
24 Dout 0
23 Dout 1
22 Dout 2
21 Dout 3
20 Dout 4
19 Dout 5
18 Dout 6
17 Dout 7
16 WRES
15 WCLK
Read Control
IN
OUT
Write Control

HM63021FP-34



C1+ 1
V+ 2
C1− 3
C2+ 4
C2− 5
V− 6
T2OUT 7
R2IN 8
16 Vcc
15 GND
14 T1OUT
13 R1IN
12 R1OUT
11 T1IN
10 T2IN
9 R2OUT

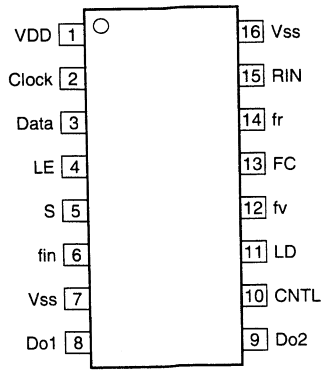
MAX232CPE



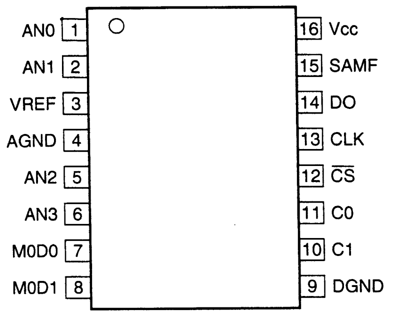
A14 1
A12 2
A7 3
A6 4
A5 5
A4 6
A3 7
A2 8
A1 9
A0 10
I/O 0 11
I/O 1 12
I/O 2 13
Vss 14
28 Vcc
27 WE
26 A13
25 A8
24 A9
23 A11
22 OE
21 A10
20 CS
19 I/O 7
18 I/O 6
17 I/O 5
16 I/O 4
15 I/O 3

62256BLFP7SL

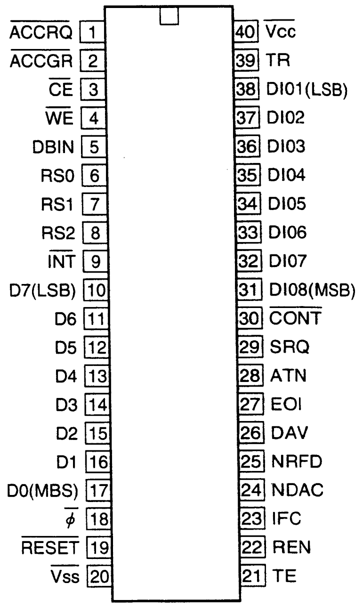
# SEMICONDUCTORS


VDD 1
Clock 2
Data 3
LE 4
S 5
fin 6
Vss 7
Do1 8
16 Vss
15 RIN
14 fr
13 FC
12 fv
11 LD
10 CNTL
9 Do2

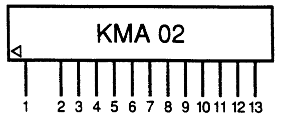
**MB86001PF-GBND**


AN0 1
AN1 2
VREF 3
AGND 4
AN2 5
AN3 6
MOD0 7
MOD1 8
16 Vcc
15 SAMF
14 DO
13 CLK
12 CS
11 CO
10 C1
9 DGND

**MB88101APFV-GB**

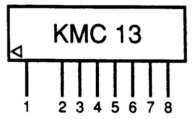

ACCRQ 1
ACCGR 2
CE 3
WE 4
DBIN 5
RS0 6
RS1 7
RS2 8
INT 9
D7(LSB) 10
D6 11
D5 12
D4 13
D3 14
D2 15
D1 16
D0(MBS) 17
ϕ 18
RESET 19
Vss 20
40 Vcc
39 TR
38 DI01(LSB)
37 DI02
36 DI03
35 DI04
34 DI05
33 DI06
32 DI07
31 DI08(MSB)
30 CONT
29 SRQ
28 ATN
27 EOI
26 DAV
25 NRFD
24 NDAC
23 IFC
22 REN
21 TE

**TMS99C14ANL**


KMA 02
1 2 3 4 5 6 7 8 9 10 11 12 13

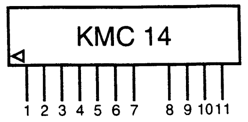
1. +140 V output
2. +140 V control
3. +55 V control
4. +55 V output
5. +12 V control
6. +12 V output
7. −12 V control
8. −12 V output
9. +5 V control
10. +5 V output
11. Sweep time reference voltage output
12. External capacitor connection
13. GND

**KMA02**


KMC 13
1 2 3 4 5 6 7 8

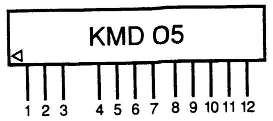
1. Signal input
2. Compensation
3. FET (source) connection
4. GND
5. + power
6. FET (drain) connection
7. − power
8. Signal output

**KMC13**

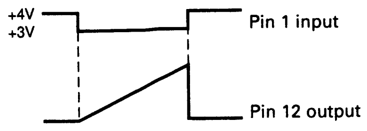

KMC 14
1 2 3 4 5 6 7 8 9 10 11

1. IN1
2. E1
3. E2
4. IN2
5. VAR
6. INV-
7. INV+
8. BAS2
9. BAS1
10. OUT1
11. OUT2

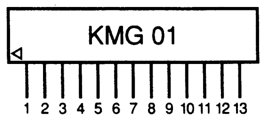
**KMC14**


KMD 05
1 2 3 4 5 6 7 8 9 10 11 12

1. Sweep gate input
2. Sweep range input A
3. Sweep range input B
4. Sweep reference voltage input
5. Sweep range input C
6. Offset input
7. − power
8. GND
9. + power
10. External capacitor connection
11. External FET connection
12. Sweep signal output

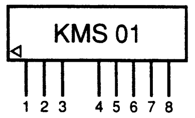

+4V
+3V
Pin 1 input
Pin 12 output

**KMD05**


KMG 01
1 2 3 4 5 6 7 8 9 10 11 12 13

1. MIX signal output A
2. GND
3. Signal input A
4. + power supply
5. Bias setting
6. External control
7. R/O character signal input
8. R/O character position input
9. R/O switching signal
10. − power
11. Signal input B
12. GND
13. MIX signal output B

**KMG01**


KMS 01
1 2 3 4 5 6 7 8

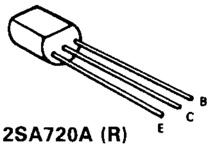
1. Analog signal input
2. + power
3. GND
4. Digital signal output A
5. Digital signal output B
6. Digital signal output C
7. Digital signal output D
8. Digital signal output E

| Analog signal input [V] | Output | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| 0.25 ~ 0.45 | L | H | H | H | H |
| 0.95 ~ 1.15 | H | L | H | H | H |
| 1.65 ~ 1.85 | H | H | L | H | H |
| 2.35 ~ 2.55 | H | H | H | L | H |
| 3.05 ~ 3.25 | H | H | H | H | L |

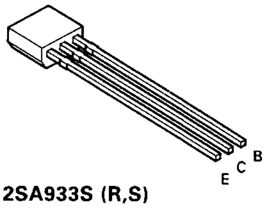
L : 1.0 [V] max
H : 4.5 [V] min

**KMS01**

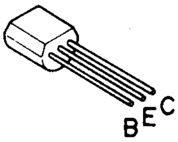
# SEMICONDUCTORS



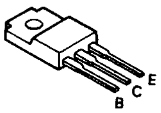
2SA720A (R)
2SA1005 (K)
2SA1208 (S)
2SC1318A (R)
2SC1907
2SC1923 (O)
2SC2551 (O)
2SC2910 (S)



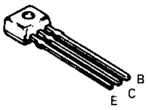
2SA933S (R,S)
2SC1740S (R,S)



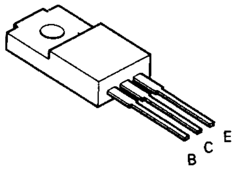
2SA1161
2SC2644
2SC3779 (D)



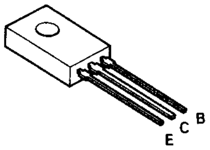
2SA1304
2SB1015 (Y)
2SD1406 (Y)



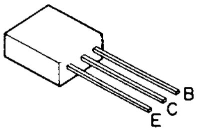
2SA1459 (K)



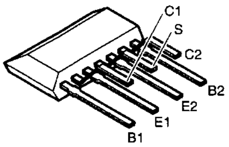
2SA1499 (O,P)



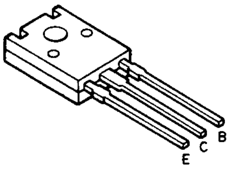
2SA1828 (E)
2SC4732 (E)



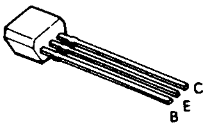
2SC3354 (S)


C1
S
C2
B2
E2
E1
B1

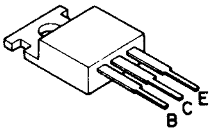
2SC3381 (GR)



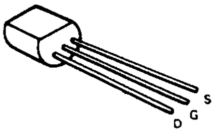
2SC3952 (D)



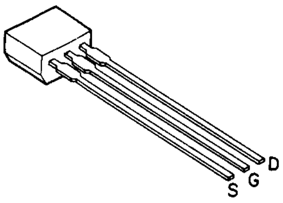
2SC4049



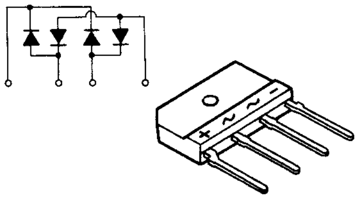
2SD613 (E)



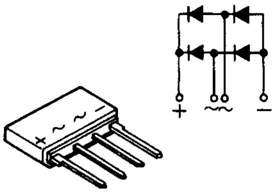
2SK170 (V)



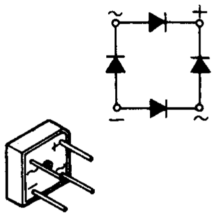
2SK404 (E)



D3SB20



S1VB60



S4VB20F